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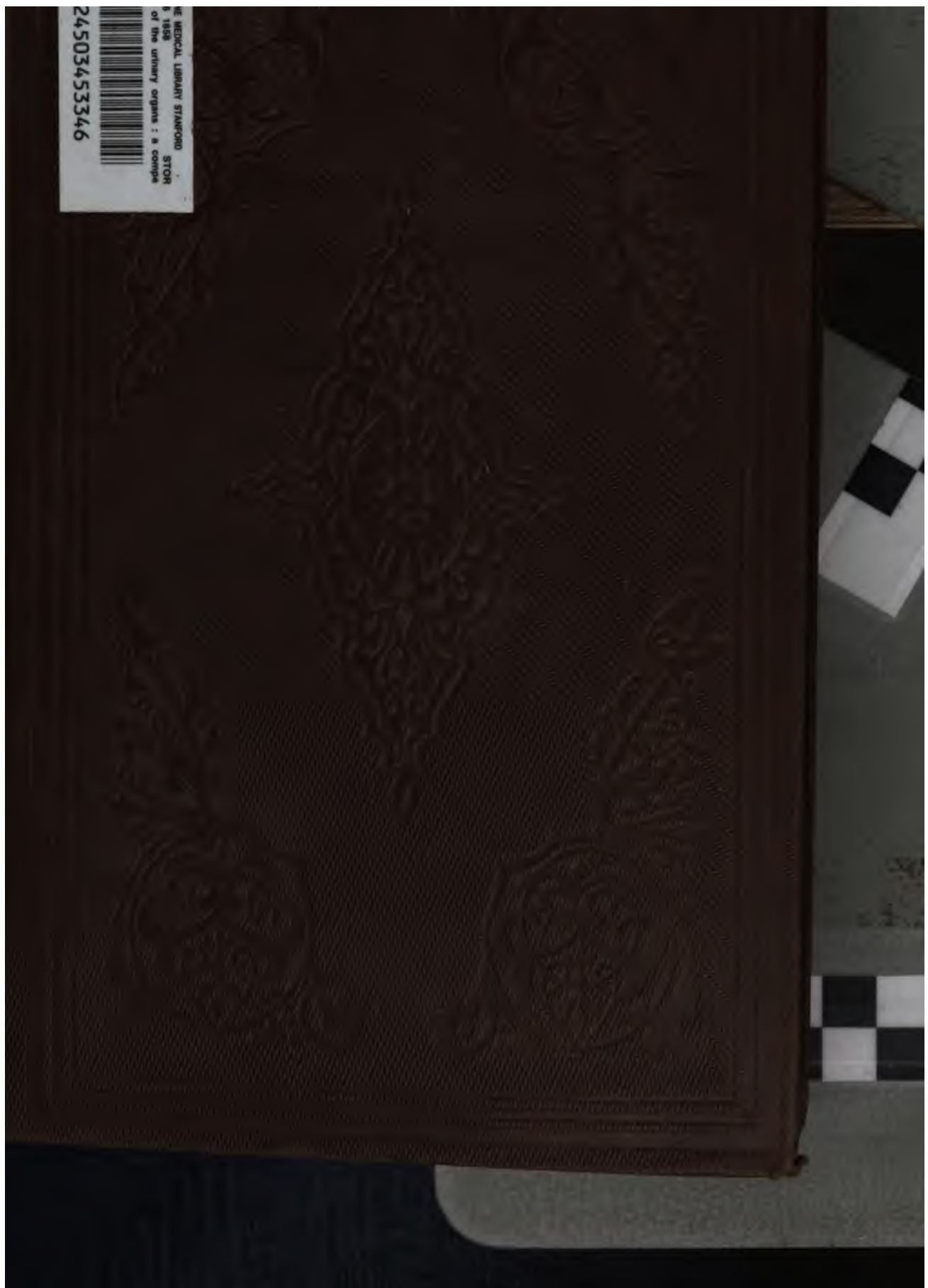
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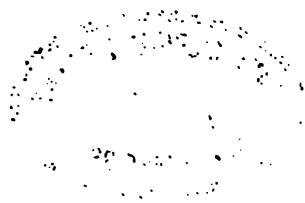


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DISEASES
OF THE
URINARY ORGANS.

A COMPENDIUM

OF THEIR
DIAGNOSIS, PATHOLOGY, AND TREATMENT.

BY

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WITH ILLUSTRATIONS.



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To the Memory

OF THE LATE

ABEL LAWRENCE PEIRSON, M.D.,

FELLOW OF THE MASSACHUSETTS MEDICAL SOCIETY, AND OF THE AMERICAN ACADEMY OF ARTS
AND SCIENCES; FORMERLY ONE OF THE CONSULTING SURGEONS OF THE
MASSACHUSETTS GENERAL HOSPITAL, ETC., ETC.;

WHOSE EXCELLENT JUDGMENT, INDOMITABLE ENERGY, AND NOBLE IMPULSES

WERE ONLY RIVALLED BY HIS

KINDNESS OF HEART, TENDERNESS OF FEELING, AND UNTIRING

BENEVOLENCE;

WHOSE SOUND AND PRACTICAL TEACHINGS IN MEDICINE AND SURGERY

WERE APPRECIATED BY MANY ATTACHED PUPILS;

AND WHOSE PREMATURE LOSS HAS GRIEVED SO MANY HEARTS;

This Volume

IS AFFECTIONATELY DEDICATED BY

THE AUTHOR,

WHO WAS PRIVILEGED TO ADD TO THE BENEFITS DERIVED FROM

SUCH QUALITIES,

HIS PRECEPTOR'S INVALUABLE FRIENDSHIP.

P R E F A C E.

THE present volume is mainly composed of the substance of two Essays, to which prizes were awarded by the Boylston Medical Committee, in the years 1855 and 1857. The questions proposed were such as to render it necessary to examine the entire subject of Urinary Pathology, and to present a digest thereof, which, with certain alterations and additions since made, will, it is believed, constitute a convenient Handbook for the large class of practitioners whose leisure does not allow them an extended examination of authors. In a comparatively limited space, they will thus be enabled to review the chief phenomena of Urinary Diseases, and will have at command the methods of treatment relied on by the best authorities.¹

The presentation of the signs which enable the physician to ascertain the existence and determine the nature of the several affections; and the designation of the means by which doubts may be resolved when such signs do not exist, or are but imperfectly apparent, will comprise the portion devoted to Diagnosis. The Pathological and Therapeutical information now recognized and daily tested, will form the remainder of the volume.

In endeavouring to perform this task, our researches have been strictly confined to those diseases arising in, or especially mani-

¹ Notwithstanding the very considerable modification of the original manuscript, the writer feels bound to state "that the Board (by a vote in 1826) do not consider themselves as approving the doctrines contained in any of the dissertations to which premiums may be adjudged."

fested by the organs in which the urine is elaborated, temporarily retained; and the passages through which it flows.

Specific affections of the *urethra*, therefore, as chancre and gonorrhoea, the results of an imported poison, will be excluded, although their effects, on the urinary organs proper, may demand occasional notice. By this arrangement, more clearness and conciseness will be attained. Disorders manifested by certain organs have not, necessarily, their origin within them; and the subjects here examined seem thus to find their natural limits.

Diabetes is not properly a disease of the Urinary Organs. Regarded of late years as but one form of dyspepsia, it is only within a short time that the brilliant experiments of M. Claude Bernard have revealed to us the source of the sugar which, by its powerful diuretic action, occasions the polyuria constituting the most prominent feature of the affection. This disturbance of the functions of essential organs, and especially the newly-discovered glucogenic function¹ of the liver, are worthy the best attention of the pathologist.

It is interesting, in this connection, to refer to the opinions of the ancients, many of whom looked upon diabetes as merely a derangement of the digestive organs. Thus, Celsus directs all his treatment to regulation of the diet, and Aretæus, after discouraging the

¹ Bernard has announced that *starch* is the immediate product of the liver, and that sugar is subsequently formed by a special ferment which acts on the starch within the liver. So that the action is double; that is, physiological and chemical. Pelouze continued Bernard's experiments, and the term amylo-genetic is the correct one to apply to this hepatic function.

Like all other discoveries of importance, Bernard's have undergone a most searching investigation; and several observers have undertaken to amend, whilst some deny, his conclusions—so far, at least, as the glucogenic function of the liver is concerned. Amongst others, Dr. Louis Figuier, *Agrégé de Chimie* in the Parisian Pharmaceutical School, read a paper before the French Academy of Sciences, July 27th, 1857, entitled "New Facts and Considerations against the existence of a Glucogenic Function of the Liver;" and since then several reports of various tenor have been made.

use of liquids, recommends that the whole attention be devoted to the disorder of the stomach. It is true that he compares it with dropsy, and also that Galen referred the disorder to the kidneys, and not to the stomach; yet all have recognized the existence of indigestion, and the importance of treating it.

Nearer our own day, Dr. Prout thus estimates diabetes; all the pathological changes observed by him in the kidneys, are those due to overwork, not such as arise from inherent disease.

It would in no degree advance the objects we have in view, to present the long array of opinions and facts which make up the *history* of urinary diseases. Early medical annals and later records are full of interest in this respect; but such details would only encumber us whilst simply endeavouring to recognize, analyze, and indicate the treatment of the several affections. To give a condensed account of all that is considered *essential*, is our purpose. We can therefore only refer to the voluminous writings of the older medical authors, as exceedingly worthy of study. Amongst others, Paulus Ægineta is conspicuous, and his translator, Dr. Francis Adams, gives an important summary of all that concerns our subject in the writings of the Greeks, Romans, and Arabians. Modern science, with all its advances, may still admire the close observation and acute application manifested by the Fathers of our Art. In the "Airs, Waters, and Places" of Hippocrates, we find the first observations in regard to urinary calculi; and as one of his commentators well observes, the etiology of this affection is nearly as obscure as it was in those early days, notwithstanding the developments of modern chemistry.

To the latter science, however, and to its coadjutor the microscope, the practitioner now turns for the solution of many problems presented to him by the urine in manifest, or in suspected, disease; and it may also be said without exaggeration, that nearly every thread of the healthy and morbid tissues of the urinary organs has undergone the searching scrutiny of the test-tube and the lens.

While the ancient physician was more prone to regard Prog-

nosis, the modern, in his devotion to accuracy of Diagnosis and minute pathological investigations, is more likely, by a rationally founded course of remedial measures, to relieve suffering and to save life.

A few Notes have been added at the end of the volume. These relate to interesting cases, or to opinions of value enunciated since the body of the text was prepared. The illustrations deemed necessary, are taken from reliable works, or selected from late reports in scientific journals.

The author takes this occasion to express his acknowledgments to his friend Dr. Fitch Edward Oliver, of Boston, for valuable aid in arranging certain portions of the text, and in correcting the proofs.

Boston, September, 1858.

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D I A G N O S I S.

"Multum egerunt qui ante nos fuerunt, sed non *per-*
gerunt; multum adhuc restat operis, multumque resta-
bit; nec ulli nato, post mille sæcula, præcluditur occasio
aliquid adhuc adjiciendi."

SENeca.

DISEASES

or

THE URINARY ORGANS.

PART I. DIAGNOSIS.

CHAPTER I. GENERAL CONSIDERATIONS.

It requires no little investigation accurately to diagnosticate even the most frequently observed of these affections; and as the range of observation is necessarily extensive, the results are proportionately numerous and important.

Anatomy and Physiology afford us much assistance; Etiology even more; Semeiology and Symptomatology, combined with Chemical and Microscopical analyses and tests, are our chief reliance; Pathological Anatomy, by its confirmation of previous ideas, aids us in similar, recurring cases; our experience in Treatment is often very valuable; by it we may recognize mere functional disturbance, and it frequently serves, indirectly, to ratify or preclude an opinion.

I. ENUMERATION OF THE URINARY ORGANS.

The Urinary Organs are the Kidneys, which are true glands; the Ureters, which are the first conduits for the transmission of the urine, as secreted; the Bladder, which is its receptacle for a certain time; and the Urethra, the second conduit for the urine, when ready for excretion.

The Supra-renal Capsules, although not classed with the above,

will be considered in connection with them, being related by contiguity, and occasionally involved in the same diseases.

II. ANATOMICAL RELATIONS.

While a detailed anatomical description is unnecessary, a short account of the positions and relations of the organs is desirable; and this, in great measure, with reference to difficulties of diagnosis arising from occasional anomalies.

The Kidneys, surmounted by the supra-renal capsules, are situated in the lumbar region, behind the peritoneum, on each side of the vertebral column; are usually embedded in fat; touch the diaphragm, the anterior portion of the transversalis muscle, and are in close vicinity to the quadratus lumborum and the great psoas.

The right kidney is lowest; it is in proximity to the liver, duodenum, ascending colon and its flexure; the left, higher up, comes into relation with the stomach at its greater curvature; with the spleen, descending colon, and a portion of the small intestines.

The texture of the kidney is dense and friable; it is invested by a fibrous capsule, consists of a cortical or vascular portion, and of an internal, tubular substance, which latter is formed by the "cones" or pyramids of Malpighi; the cortical substance not only forms the surface of the kidney, but, with the uriniferous tubuli, surrounds the Malpighian cones. The pelvis of the kidney is a membranous sac, formed by the union of three cavities, called infundibula, which communicate with the calices, "cup-like pouches" of mucous membrane, going off from each cone.

The Ureters are membranous tubes; in health, about the size of a goose-quill; about eighteen inches long, continuous above with the pelvis of the kidney, and smaller in calibre inferiorly, passing obliquely into the bladder between its muscular and mucous coats. Their outer coat is fibrous, their inner, mucous; and this is true of the pelvis, infundibula, and calices of the kidney. The ureters pass behind the peritoneum; the spermatic vessels cross them; they touch the anterior margin of the psoas muscle, and cross, first the common, and then the external iliac artery and vein. There are sometimes two ureters to one kidney. (Wilson, Cruveilhier.)

The Urinary Bladder is ovoidal in shape, membranous in structure, lying behind the ossa pubis and in front of the rectum. It is

described as to its body, base, and neck; is held in place by several ligaments, of which the urachus, a foetal relic, constitutes one. Its coats are three; the external or serous, the muscular, and the mucous.

Its *relations* are highly important. To the peritoneum, which invests a portion of it; to the rectum; to the vagina and uterus in the female; to the prostate gland in the male; by continuity, its connection with the urethra, in both sexes, particularly in the male, is never to be lost sight of. The *vesiculæ seminales* lie against the under surface of its base.

The Urethra is a curved, membranous canal, consisting of two coats—one mucous, the other elastic and fibrous. It extends from the bladder to the meatus urinarius. The portion involved in the prostate gland is about one inch in length, naturally, and often acquires much importance in affections of the gland. Certain external and internal causes may diminish its calibre and greatly change its textures.

Its whole length in the male is about nine inches; in the female, one inch and a half; and it is in her remarkably dilatable, by reason of “a proper coat of elastic tissue” which surrounds its mucous membrane. (Wilson.)

III. OCCASIONAL DIFFICULTY OF DIAGNOSIS FROM ANOMALOUS POSITION OF CERTAIN OF THE ORGANS.

This must be a comparatively rare occurrence, but should not, on that account, be allowed to pass unobserved. The obscurity in which diagnosis may be involved by such an accident is best illustrated by examples.

Cruveilhier relates an instance of union of the two kidneys into one, which was situated, very unusually, in the pelvis, behind the rectum. The patient, he says, was gradually wasted by hectic fever, the cause of which was undetected during life; on *post-mortem* examination, the doubled kidney was found, as stated, anomalously placed, and it was the seat of a large abscess, which had opened into the rectum, and thus discharged its contents. We are not informed whether the presence of pus had been observed in the alvine evacuations, but even if it had, would it probably have been referred to the true source? Another anomalous position for

one of the kidneys is in front of the spine; in certain cases, as in any affection inducing renal pain, this deviation from the normal situation of the organ might greatly mislead the practitioner. This latter case is, according to Cruveilhier, more rare than the former, although both have been not infrequently observed. Accidental, as well as congenital, displacement is also mentioned; and this may often be caused by tight lacing, the right kidney being the one hitherto observed to be displaced, and doubtless from the pressure of the corsets upon the liver, which gradually forces the kidney into an abnormal position; it has been found in the right iliac fossa, in front of the sacro-iliac symphysis, and pushed upwards to a level with the adherent border of the mesentery, in the substance of which it was placed. (Cruveilhier, *Anatomie*.)

In the *Gazette des Hôpitaux* (June 6th, 1857), an instance of anomalous situation of the left kidney is related, accompanied by certain remarks. We subjoin a portion of the report.

Dr. Aubé is the authority, and the statement was made to the *Société Médicale de Rouen*. It is remarked that the kidneys are the most frequently anomalously placed of any of the glands in the body. The causes are stated to be either affections of neighboring organs, degeneration of the kidneys themselves, or when they contain calculi which make them weigh a pound or more; or the condition is *congenital*, and then, in the reporter's opinion, the *left* kidney is most often affected.

The patient referred to by M. Aubé was a girl of twelve years. The right kidney and the left supra-renal capsule were in place, but the left kidney lay upon the vertebral column, just above the sacro-vertebral angle, and as if fitted in between the two divisions of the abdominal aorta, its concave border looking directly downwards. Its somewhat flattened anterior aspect lodged two arteries in two depressions of the surface, which latter was divided into three portions. One of these vessels sprang from the primitive iliac, the other from the hypogastric. A third artery came from the aorta, just above its bifurcation, and accompanied the other two to the kidney. One ureter and one vein emerged from the latter.

An analogous fact is quoted by the reporter from the *Mémoires de la Société de Médecine* (tome x. p. 66). The displaced kidney was found in the interval of the aortal bifurcation; the subject was a man of fifty years. Pacoud, adds the account, cites still another example; the *left* kidney being found in the upper cavity of the

pelvis, behind the bladder, and at the side of the rectum, which latter was pushed slightly to the right. The kidney was triangular in shape, lay somewhat over the anterior face of the sacrum, had one vein going from it, and received three arteries.

The tumour formed by the displaced right kidney has been often taken for a morbid product, or else the patient treated for obstruction of the liver. The importance of a knowledge of these possible congenital or accidental displacements can hardly be too highly estimated. The diagnosis in such cases must be rather the *diagnostique raisonnée* than one derived from the usual evidences. Of course, such deviations may often exist and no manifestation of disorder occur from the fact of displacement alone; yet, where artificially produced, such disorder is likely enough to happen, and, moreover, if a tumour become perceptible to view or to touch, real illness might ensue from apprehension alone of its existence.

Many practical advantages arise from familiarity with the relations of the displaced kidneys with other organs; and the more intimate these relations, certainly the more difficult will diagnosis become, except in those cases in which the signs and symptoms belonging decidedly to disease of the urinary organs greatly preponderate, and thus do not so strongly induce the doubt whether those organs are inherently or only sympathetically affected.

An instance is related by M. Brochin, in the *Gazette des Hôpitaux*, Paris, July, 1854, of what is termed by M. Rayer *luxation du rein*; others have called it *rein mobile*. This is one of the anomalous positions of the kidney, sometimes congenital, but doubtless often artificially produced, as mentioned above, by tight or ill applied corsets. In this case, the patient had for a long time experienced pain in the abdomen, of a vague character and of variable intensity, even momentarily changing, with other disagreeable sensations; and finally, she herself perceived a tumour, on palpation, in the left hypochondrium. Strongly preoccupied with thinking how much of grave import her condition might imply, she consulted a physician, who rather increased her fears, by prescribing strong resolute means. After a long course of active and often painful treatment (moxas, blisters, etc.), with no good result, she came to the hospital wards of M. Nélaton, who, on attentive examination, recognized, in the movable, floating tumour (which could be nearly seized by the hand, could be brought forwards, and pushed backwards, or upwards under the ribs), the *displaced kidney*.

In this case, it is evident that the diagnosis lay between the spleen and the kidney, if we refer the tumour to any natural or diseased organ. The spleen, as the reporter of the case remarks, would not have the great mobility observed; it would be larger and more adherent. Moreover, percussion over the usual site of the spleen gave the dull sound usually found there. Epiploic tumour was not an admissible supposition, there being no cachexia, and no indications of cancerous disease; for when cancerous or tuberculous masses exist in the abdomen, and are movable, and of the shape of the kidney, diagnosis may be obscure or doubtful.

By *exclusion*, in instances like the above, is a diagnosis obtained; the kidney is likely to be the *tumour* which has caused such anxiety to both physician and patient; and it is far from impossible that the distress of mind in the latter might be the only serious difficulty. A state of physical suffering might be the result, which, were it only temporary, is greatly to be deprecated. If the idea of grave illness were maintained, and, by consequence, a correspondent treatment, irreparable injury might ensue.

In such circumstances, how happy may we esteem ourselves if we are able to relieve pain, and to calm anxiety, by the proper application of a bandage, retentive of the displaced organ! This, however, is not always possible; indeed, Professor Oppolzer, of Vienna, pronounces the treatment "by bandages and the like to be of no avail."¹ It may at least be tried.

In a case so interesting and important as the above, we may even look further. If there be no renal symptoms proper, not even functional disorder of the urinary apparatus, the conclusion is natural that the uncomfortable feelings, and even the pain, *may* be owing

¹ Wein Wochenschrift, No. xlii., 1856. Oppolzer also remarks that the tumour may be manifest only while the patient is "standing or lying on one or the other side, disappearing again during the horizontal posture." We not long since saw a patient in whom it was, if anything, more distinct while she was in the horizontal posture than when erect. In fat persons, the diagnosis may be impossible, but it is not difficult in those who are thin, as the form of the swelling can be traced, while the tumour can be pushed into the lumbar region, and there felt. "The pain to which it not infrequently gives rise cannot be mistaken for neuralgia, colic, or rheumatism, if the practitioner will only make an exact exploration; while the tumour resulting from a collection of feces assumes another form, and does not appear in, or disappear from the lumbar region in consequence of pressure." (*Auct. et loc. cit.*, from *Med. Times and Gaz.*, June 6th, 1857.)

to some concomitant affection.¹ In cases similar to these, M. Rayer has signalized the absence of every symptom possibly referrible to the kidney.

Again, the displacement alone is sometimes a sufficient cause for disordered manifestations. The dragging, heavy sensations, especially during exercise or defæcation, and pain on pressing the swelling, owing mainly to traction of the vessels, are distinctive; and but a short time would ordinarily be required, after remedying to the best of our ability the accident itself, to ascertain the presence of disease. Careful exploration must assist the often obscure evidence derived from symptoms, in determining the existence of movable kidney.

We have thus seen that treatment of the kind mentioned is not only useless, but cruel; and every such instance is precious to the physician who is ambitious accurately to discriminate in the important affections under consideration, and to secure the comfort, it may be even the existence, of those intrusted to his care.

A knowledge of healthy anatomical arrangement, and of its possible deviations, is therefore invaluable to the practitioner, and should form the foundation of his diagnostic examinations, whenever the disease is not *per se*, and readily apparent.

While considering our subject somewhat generally, the *physiology* of the organs, and much that harmlessly, or nearly so, affects their functions, may appropriately claim a passing notice, reserving more minute points for the consideration of each particular disease of the organs.

The physician will be likely to remember, when a case is newly presented to him, the frequently strong action of the mind upon the sensitive apparatus, which, by some disordered manifestation, is causing uneasiness to the patient, or perhaps forewarning his adviser of approaching or existing structural disease.

To distinguish between mere functional disturbance, arising from transient causes, and the commencement of serious disease, is by no means, *at first*, an easy task. The use of certain articles of food or drink, as is well known, may cause temporary disorder; strong mental emotions affect no organs more powerfully (if we except the heart) than the excretory; while, to our knowledge, from personal observation, the rectum is often stimulated to contraction, not to be

¹ See Appendix, Note "C."

resisted, by sudden excitement, apprehension, or fear,¹ it is needless to mention the well known action of these emotions on the urinary bladder, in causing the unwilling subject thereof an impromptu evacuation, not always under circumstances favourable to his comfort.

The depressing passions doubtless have a *converse* action, not so often remarked, but perhaps more important.

The *age* of the person under examination must always be considered; much diagnostic information may thus be acquired. The physician will at once account for that deficient propulsory power of the bladder which keeps his middle-aged or old patient long and ineffectually striving at the urinal; which delay, in a young and active person, he would immediately ascribe to different causes. We well remember having our attention early called to this point by a medical friend, himself beginning to experience this difficulty, and which induced him to say there was one thing he could hardly help envying in younger men—their prompt excretion of their urine.

To say that this condition of deficient propulsory power may in some cases be mistaken and wrongly treated, is not hazarding much. To an acute observer, much may be set down as remediable, without opening a grand battery of treatment; and, in the management of many affections connected with these organs, *tact* may often come off triumphant where science has been beaten, because she really was not needed; if the physician begin in all cases by exercising common sense, he will, all the more fitly, in the course of his investigations, avail himself of more recondite means.

Some ten years since, a healthy young gentleman, of the legal profession, consulted the writer in reference to difficulty of urinating; his apprehensions were highly excited, his spirits much depressed, and by constantly dwelling upon his symptoms, he was doubtless doing much towards prolonging them.

Learning that some weeks previously, while at a party, he retained his water against powerful desire for micturition, and *until this desire left him*; and that, on leaving the house, it was only by violent effort that little by little he evacuated a large quantity; it

¹ We know a healthy person, of nervo-bilious temperament, whom excitement or anticipation of going into society, with the desire of appearing to advantage, will send to the water-closet from six to eight times in the course of an hour. The inclination, purely nervous, vanishes the instant he mingles with the company.

was evident upon what the subsequent difficulty originally depended—the loss of tone in the muscular coat of the bladder. The urethra, tested by passing the catheter, was found subject to a degree of spasmodic stricture,¹ was free, and otherwise healthy, and all the symptoms eventually yielded to fomentations with anti-spasmodics, and to buchu and uva ursi internally.

Similar cases are often intrusted to charlatans, who magnify what is usually a manageable condition into real disease, the patient's fears being aggravated by their formidable declarations.

We thus see how accurate the information given to the physician should be in order that he make a true diagnosis; and the above case is only one of many such, where the experiences of treatment by unprincipled or ignorant persons might have been avoided.

If, therefore, we may learn much to guide us in our discrimination of urinary disorders, from the recollection of the *normal anatomy* of the organs involved; from their *unusual distribution*; from their *physiological relations* to the various influences surrounding them; *the atmosphere and its changes*; *food and drink*; *medicinal agents*; *mental emotions*; *restrained function*, and many others; let us not despise these coadjutors of the vast array of minuter scientific examinations. In this manner, we shall be unlikely to treat a displaced healthy kidney as a diseased enlargement, nor shall we imagine that, if any of our patients perceive an inclination to urinate more frequently under the shock of sea-bathing, they are threatened with diabetes, polyuria, or irritable bladder.

¹ Of marked intensity, but temporary.

CHAPTER II.

AFFECTIONS OF THE SUPRA-RENAL CAPSULES.

ALTHOUGH none of the more formidable and common urinary diseases are referrible to these organs, yet, from their having been discovered morbidly affected on *post-mortem* examination, we are led to consider them; for even by contiguity, existing disease in them might reach the kidneys, and possibly other organs consecutively. To locate during life any affection with positiveness in the renal capsules, would demand an acumen hardly possessed by medical observers in the present state of the science.¹ Disease in them must be rare; indeed, so little is known of their physiological relations and uses that their pathology can hardly be otherwise than circumscribed.

It is generally believed their chief purpose is fulfilled during embryonic life; therefore it might be expected, if diseased with any frequency, it would be most often observed at a very early period of extra-uterine life, being that nearest to the stage of their greatest activity.

Rokitansky remarks that their diseases place them in a more distinct relation with the lymphatic glands than with the kidneys. According to him, they do not follow the latter organs in their congenital displacements, neither do they become fused, as do the kidneys.² Kölliker inclines to attribute to them more intimate analogies and relations to the nervous system, from their abundant supply of nerves.

¹ Since this was written, the remarkable investigations of Addison have everywhere drawn attention to the affections of the supra-renal capsules in connection with the *bronzing of the skin*. The present text is left nearly as it was written, because the subject will be found presented at some length when treating of the pathology of the organs. (See Part II., Chapter II.)

² This latter statement is disproved by specimens of fusion of these organs preserved in the cabinet of the Boston Society for Medical Improvement. (Specimens 762, 789.) See also Part II., Chapter II.

Although so independent of the organs they surmount, they may communicate injury when themselves diseased. Hæmorrhage takes place into their texture; inflammation occurs in them; in the newly-born infant, and in the fœtus even, they have been found "converted into purulent pouches." (Andral.) Neither these, nor the existence of tubercle, cancerous degeneration, &c., which necroscopy discloses in these organs, have been detected during life. The same deposits and degeneration, in other viscera, accompany the above morbid changes; especially, according to Rokitansky, do the lymphatic glands exhibit this. (*Pathological Anatomy*.) Ossification of the renal capsules has been observed, *post-mortem*. In a specimen in the cabinet of the Boston Society for Medical Improvement (No. 595), it was supposed to be the result of tuberculous disease. Death occurred from typhoid fever; nothing, during life, had drawn attention to the urinary organs. In the same cabinet, specimen 596 shows a large encysted tumour in the situation of the left renal capsule, taken from a female 40 years of age. The patient herself perceived this tumour, below the left hypochondrium, ten months before death; no tenderness or pain was felt in it. On dissection, it was found to adhere closely to the left kidney, to the pancreas, and to a portion of the colon; there was no malignant disease; a cancerous breast had been previously removed. Diagnosis, in a like case, would rest only upon the *localizing of the tumour*, and it is evident this would be nearly, if not quite, impossible.

It is true, the supposition might occur of disease seated in the supra-renal gland, but the kidney would be more likely to be suspected; or very probably a morbid growth involving neither of these organs. With the knowledge derived from necroscopic inspection, similar circumstances might find the practitioner more ready to remember the capsule. The rarity of the case, and the little, if any, constitutional disturbance, make an accurate diagnosis at once difficult, and of comparatively minor consequence.

CHAPTER III.

DISEASES OF THE KIDNEYS.

WITH certain modifications of the arrangement, the enumeration of the diseases of the kidneys adopted by Dr. George Johnson will be followed.

NEPHRITIS.

A. *Acute Desquamative Nephritis.*

B. *Chronic Desquamative Nephritis.*

WAXY DEGENERATION OF THE KIDNEY.

NON-DESQUAMATIVE DISEASE OF THE KIDNEY.

FATTY DEGENERATION OF THE KIDNEY.

SUPPURATIVE NEPHRITIS.

NEPHRITIS FROM RETENTION OF URINE.

PYELITIS.

NEPHRITIS FROM RENAL CALCULI.

TUBERCULAR OR SCROFULOUS DISEASE OF THE KIDNEY.

CANCER OF THE KIDNEY.

HÆMATURIA.

Before examining the diagnostic signs of the diseases of the kidney, individually, some attention should be given to the *functions* of the organs when healthy, inasmuch as, in every organ of the human body, function may be perverted for a long time, and yet no structural disease exist. A correct diagnosis is here very important.

The kidneys being depurators of the blood, and removing therefrom the "unassimilated, superfluous, and effete albuminous principles," as well as the mineral matters incidental to those principles, or derived from other sources,¹ are obviously of the highest importance in the system. The reciprocal action of a diseased condition

¹ Prout.

of the circulating fluid, and of any affection of the kidneys which at once and permanently interferes with their function, is of course very powerful, and sooner or later must make itself distinctly felt. While, therefore, many manifestations of renal disease are referrible to a diseased condition of the blood, the latter may become a first cause in producing derangement of urinary function, and, finally, disorganization and irreparable mischief.

Renal disease is often concomitant of other affections which are more prominent, and which thus enlist most of the practitioner's attention; so that formidable disorder steals a march, before even its existence is suspected. Our knowledge of the frequency of these occurrences should lead us to consider the possibility of such masked disease; and, if foreseen, much may be done to check or moderate its advances. Physical signs alone will frequently give us sufficient intimation of disturbance on the part of the urinary apparatus; often the naked eye will detect abnormal constitution, or appearance, of the urine. No time should then be lost in verifying our diagnosis by chemical and microscopical examinations; long, however, before these are made, the history and aspect of similar disease may enable the observer to understand the case before him.

The *causes* most frequently productive of renal diseases are highly important in the formation of diagnosis: bearing in mind that a depraved or actually diseased state of the blood is often the sole cause of disorder, we may also refer to *hereditary influences*. It is sufficient to instance Gout, in confirmation of their importance.

The function of the kidneys becomes seriously involved, and their task immensely increased, whenever the blood is diseased. First, the nutrition, and consequently the efficiency of the organs suffers; secondly, they are called upon to do double duty; the struggle costs them loss of substance, or they become engorged, inflamed, and their tubes obstructed; secretion is consequently retarded or entirely arrested. It is easy, in this general view, to see "the beginning of the end."

Much fallacy may arise in reasoning from mere functional disturbance. If we remember how powerfully many articles of food and drink affect the colour, odour, and quantity of the urine, a hasty judgment from these appearances will be unlikely. Inquiries as to the various *ingesta*, and whether drugs have been taken, are important. Certain articles declare themselves so distinctly by their odour and diuretic action, and produce such temporary effects,

that they merely require mention. Asparagus and turpentine illustrate our meaning. Cantharides, from the injudicious use of which such serious effects occur, might escape an ordinary observation, unless they were externally applied; especially in cases of not infrequent occurrence, when the medicine has been given with improper intent. Occasionally the symptoms are so marked and peculiar, that a mistake in diagnosis is nearly impossible. Countless cases demonstrate the importance of discriminating between derangement of function and real disease.

I. NEPHRITIS.

Inflammation of the substance of the kidney occurs from several causes, exists in various degrees, and terminates more or less seriously, according to the persistence of the acting cause, the extent of mischief done to the organs, the complications occurring, the power of resistance with which the patient is endowed, and the prompt application of remedial measures. In no affection is the insight and knowledge of the practitioner more thoroughly tried than in certain obscure cases in which, with every evidence of inflammatory action going on in the kidney, the chief question is to determine its precise nature, whether it be idiopathic or traumatic; as when a calculus, just about to emerge from the kidney into the ureter, or lodged in the latter, causes the usual symptoms of nephritis. An instance lately passed under the writer's observation, where much obscurity existed during the patient's entire illness (continuing nearly three months), in respect to the nature and cause of the trouble in the urinary apparatus. The opinion of one of the consulting physicians was unshaken, from the first, that all the symptoms were referrible to the disengagement, either complete or partial, of a calculus from the kidney; and unless discharged happily, no very flattering prognosis could, of course, be made. The patient had at first hæmaturia, of slight intensity, after exposure to cold, while driving into the country, having been previously much heated. The latter circumstance might have been accused as causative of the symptoms, the patient having once before had disorder of a similar nature from like exposure. Remission of the acute pain and hæmaturia occurred; the same physician referred this, afterwards, to a falling back of the calculus into the pelvis of the

kidney ; recurrence of severe pain (which, however, was not in the loins, but more in front, and reminding one of that in cases of biliary calculus, when passing), with fever, restlessness, nausea, and loss of flesh followed, and continued with some remission for many weeks. From the symptoms, it seemed probable that a calculus, passing from the kidney to the bladder, was at the foundation of the difficulty, but this was doubtful ; indeed, the case was not a little puzzling. One of the surgeons consulted, suggested that the *prostate gland* might be the seat of the difficulty. At last, without material change in the symptoms, the patient one day saw a small calculus (of oxalate of lime, as proved by analysis) drop from the urethra into the vessel into which he was passing water ; from that time all pain ceased, none of the other symptoms remained, and, steadily improving in health, he is now perfectly well, with no urinary uneasiness. It hardly admits of a question that the delicate diagnosis of the physician referred to, was correct in every particular.¹

Dr. Prout remarks : " All writers agree that *idiopathic* nephritis, or acute inflammation of the substance of the kidney, is very rare, particularly in England ;" and that during his long experience, he had only met with two or three well-marked instances, and could speak with precision of only one. Acute desquamative nephritis, according to Dr. Johnson, occurs more frequently than any other form of renal disease,² being associated with all the cases of acute inflammatory dropsy, whether following scarlatina or depending upon other causes.

The affection of the kidney commonly associated with the dropsy observed in connection with scarlatina, may, says this author, be taken as a type of this particular form of renal inflammation.

A. ACUTE DESQUAMATIVE NEPHRITIS. (Johnson.)

Acute Inflammation of the Hæmotrophied Kidney. (Prout.)

Néphrite Simple. (French Authors.)

The mode of accession of this affection differs but little from nephritis arising from other causes. There are chills or actual rigor, succeeded by feverish reaction, hard pulse, hot and dry skin,

¹ See Appendix, Note M.

² Others consider Bright's disease the most frequent. Vide page 47, foot-note.

dry tongue, thirst, anorexia, pain in the back and limbs, headache, and restlessness. Attention is often early drawn to a puffiness of the face, with pallor of the integument, and this is only the commencement of more general dropsical swelling.

The unaided eye perceives a marked change in the colour of the urine; it becomes of a smoky hue, or even has a "deep blood tinge;" this arises from admixture of blood, and is one of the first signs. Suppression of the urine may occur; it is at any rate scantily secreted. Its specific gravity is but little altered from the natural standard, because of the large quantity of albumen poured out; generally this is so abundant as to become almost solid when boiled, or on the addition of nitric acid.

If the patient have been exposed to cold, wet, and fatigue; have been suffering from privation and mental anxiety; be intemperate in the use of alcoholic drinks; have had scarlatina, dropsy, or any exhausting disease, and exhibit most or all of the above symptoms, nephritis probably exists, and of the desquamative form. The cholera poison is also causative, and measles have been immediately succeeded by a nephritic attack. It must be remembered that "all the causes of renal disease have this in common, that they tend to produce a morbid condition of the blood." Whether it be the poison of scarlatina, or any other infection, the effect is the same in the increased action demanded from the kidneys and in the appearances soon manifested by the urine. Whatever structural changes occur, commence in the secreting cells of the kidneys, and result from the strong effort "to eliminate from the blood some abnormal product—some materials which do not naturally enter into the composition of the renal secretion."

This form of nephritis is so termed from the appearance of desquamated epithelial matter in the urine. Calling the microscope to our aid, we decide whether the disease is simple desquamative nephritis, or complicated with a tendency to fatty degeneration, or of still different nature. The detection of the epithelial uriniferous tube-casts is a very decisive test. Simon, Pfeufer, Henle, Scherer, and Vogel have noticed them; Dr. Johnson has described them most minutely, with excellent delineations. According to him they are pathognomonic of the disease. Doubtless, for the essential purposes of treatment, the rational signs and the symptoms already mentioned will suffice; but the intimate nature of the inflammatory action can alone be determined by the delicate

test mentioned. The practitioner's course will then be quite plain; the kidneys must, if possible, be relieved from their over-taxation.

Microscopic examination discovers, in the earlier stages of this disease, "coagulated fibrin, blood-corpuscles, cells having, for the most part, the characters of renal epithelium, and occasionally crystals of uric acid." If there has been rapid and profuse hæmorrhage, the fibrin is coagulated into irregular masses, but many *cylindrical bodies* will be seen, composed of fibrin mixed with blood and epithelial cells (Fig. 1); these are the "*epithelial casts*," their usual diameter is $\frac{7}{10}$ of an inch. (Johnson.) Corpuscles of smaller size are observed in the field of the microscope, sometimes having "all the characteristics of pus." Certain casts have been remarked "consisting entirely of blood;" others have a wax-like appearance. It is quite sufficient for diagnostic purposes, if we distinctly discover the true "epithelial casts." Dr. Johnson remarks that these, together with the scattered epithelium and blood-corpuscles, are indicative of a recent attack of acute desquamative nephritis. These epithelial casts have the same character, whatever may have caused the disease. The frequent deposit of uric acid, in this affection, deserves remark; and in this respect acute, differs from chronic nephritis, and particularly from fatty degeneration, in which such a deposit is very rare. The appearance of oil in the urine, in acute nephritic cases, gives ground for anxiety; sometimes it wholly and rapidly disappears. If the oil-globules increase, while the desquamated epithelial cells diminish, fatty degeneration may be feared. Although oil may often be seen in conjunction with the epithelial casts, after two or three weeks' illness, still, if the casts preponderate, the case is hopeful. "Occasionally," says Dr. Johnson, "a portion of the blood and epithelium, having remained for some hours, or even days, in the tubes, before it is washed out, and becoming more or less disintegrated, will present somewhat the appearance of the granular casts characteristic of the *chronic* form; but diagnosis is sufficiently simple. In the acute disease, while

Fig. 1.



Epithelial casts and cells. Some blood-corpuscles are entangled in one of the casts. (After Johnson.)

desquamation continues, the 'granular casts' are mixed with epithelial casts and blood-corpuscles, which indicate the disease; and the cessation of desquamation is quickly followed by the disappearance of all sediment, a diminution of albumen, and a subsidence of the more urgent symptoms; while in chronic desquamative nephritis, the granular casts, unmixed with entire epithelium, or epithelial casts, are constantly present, and the condition of the urine varies but little from day to day." These are important facts; and, in conjunction with the rational signs and symptoms, contribute to the formation of an accurate diagnosis and to the adjustment of its differential aspects. Hæmaturia is frequent in acute, but comparatively rare in chronic, nephritis.

The *facies* of the patient is of great value in forming our estimate in this, as in every serious affection. The pallid, puffy integument of the face, the white or livid lips, alone reveal the extreme deprivation of the blood, the diminution of its colouring matter, and the draining away of its solid constituents. The loss of material sustained by the system is very evident during convalescence, and the voracious appetite then observed is thus accounted for. The concomitance of inflammation of the serous membranes, pleura, pericardium, or peritoneum, is remarked by many authors, serious obstruction of the respiratory function by inflammatory effusion into the air-cells and smaller bronchial tubes is not infrequent, and may be followed by convulsions, coma, and death. If we examine the blood in this disease, we find a decided decrease of albumen, and also a diminished density of the serum; the latter being in health from 1.029 to 1.031, sinks to 1.022, and 1.020, or even lower. (Christison.) The colouring matter of the blood at first decreases slowly, but in the latter stages of the disease, with extreme rapidity.

Dr. Christison first announced the impregnation of the fluids by urea, in 1829. Not only the blood, but also the fluid of drop-sical effusion is pervaded by it. Dr. Rees has detected urea in the *milk* of a patient affected with disease of the kidney.

Accurate diagnosis avails chiefly in the first stages, yet it is not without benefit that we scan the revelations of pathological anatomy, if it be only to ratify the suppositions formed, or the firmer conclusions attained. The convoluted tubes of the kidney are found to be unnaturally opaque and filled with epithelial cells, which have been thrown off, and gradually choke their cavities. The

ACUTE DESQUAMATIVE NEPHRITIS.

desquamative process arising from over-action of elimination of morbid blood-elements, leads us to the following results. Inflammatory *engorgement* of the kidneys, enlargement and thickening of the tissues, with arterial congestion are observed. The Malpighian vessels "are thickened," and the blood-corpuscles within them, under the microscope, appear "larger, and of a lighter colour." Without particularizing further, the pathological appearances just mentioned confirm the evidences already adduced as diagnostic.

One of the most valuable results of microscopic examination in cases of acute nephritis, is the determination of the character of the disease in reference to curability: if demonstrated to be *acute and recent*, we have more hope of a favourable termination.

Dr. Johnson has remarked the great rapidity with which the convoluted tubes become filled with epithelial *débris* in nephritis following cholera. As the cholera poison has been quite frequently a cause of this species of nephritis, many opportunities must necessarily be afforded, during an epidemic, of studying the diagnostic points of the disease, provided they be not lost sight of in the chief malady. The chemical and microscopical tests have been demonstrated as alone decisive in these cases. The modes of applying them are so abundantly given in professed treatises upon these diseases, and in special monographs, that it is needless to mention them here. It may be stated, however, that heat and nitric acid, to discover the presence of albumen, are indispensable agents in these researches; and secondly, the *cleanliness* of test-tubes is of the highest importance in making experiments. "Albumen may escape detection when dirty test-tubes are used, since a small quantity of an acid or an alkali prevents the coagulation of albumen by heat." Care should also be exercised to ascertain, before testing with nitric acid, whether patients have been, or are, taking copaiba, cubebs, or other resinous substances: "A white, turbid precipitate" in the urine of such patients is often caused by nitric acid. Heat will not produce it under these circumstances. It is well to remember that large doses of the resins mentioned may "*actually produce temporary albuminuria*," and thus entire fallacy of diagnosis might happen in case of want of inquiry by the practitioner. Unless the physician be an expert, microscopic examination of the sediment in the urine should be intrusted to a professed analyzer. The practising physician is at present very fortunate in being able to refer for infor-

mation upon these essential points, to adepts who can give an immediate and reliable reply. In the practice of physic, as in legal medicine, these investigations often turn the scale; the patient is curable, and the culprit acquitted, or *vice versa*, in accordance with the revelations of the test-tube and the lens.¹

Dr. Johnson remarks that, when the sediment in the urine is scanty, the latter should be allowed to stand for some hours previous to examination; if there be an abundant deposit, it may be tested at once. He uses glasses of about four ounces capacity, "of conical shape, like an ale-glass; so that the sediment, when scanty, may be deposited within a small space at the bottom of the glass." Cleanliness is here indispensable to accuracy; for a minute quantity of sediment adhering to the glass might lead to serious error, if a different specimen be placed in it, subsequently, for examination. A magnifying power of about two hundred diameters, and a quarter-inch object-glass, with a low eye-piece, are recommended.

Summary of Symptoms.—The following summary of symptoms

¹ We would refer, in this connection, to the excellent account of *urinoscopy*, as practised by Dr. Heller, of Vienna, furnished by Henry K. Oliver, Jr., M. D., in a letter from that city addressed to Dr. J. Mason Warren, and which is published in the *Boston Medical and Surgical Journal*, for August 27, 1857. A few points insisted on by Heller may be briefly noted. 1. Urine for examination should be that of the night, and unmixed with any other specimen from the patient. 2. The quantity of fluid taken, and whether perspiration has taken place. 3. If medicines have been administered, and of what nature. *Test-methods.*—We mention a few of these: 1. In testing with nitric acid for albumen, much stress is laid upon the method of introducing the acid. To two ounces of urine, in a bell-shaped glass of four ounce capacity, add a small quantity of nitric acid, inclining the glass so that it may flow down its side, not drop upon the surface of the urine. "If albumen be present, a whitish layer is formed in the centre of the fluid, whose edge above and below is quite sharply defined." For the colouring matters of urine the processes are simple and easy of application. "Urophœin is tested by adding a small quantity of urine to a larger quantity, say two ounces, of pure sulphuric acid. If urophœin be present in normal quantity, the mixture becomes crimson—of a shade similar to that of a like quantity of currant-jelly." Uroxanthin is revealed by muriatic acid, added *guttatim*. Bilephœin is discovered "by the change of color (to blue, violet, and red) under oxidation with sulphuric acid." There is an increase of urophœin "in acute inflammatory diseases, especially of the thoracic organs." The increase of urophœin is greatest "in acute and chronic affections of the liver." There are several other processes and results worthy of note. "Whether," writes Dr. Oliver, "the inferences from the changes in the urine verified here [Vienna] will also be found good with us and in England, is another point to be decided; this is admitted by Heller himself." It is also remarked that oxalate of lime and urate of soda are far more commonly observed in the urine in England and the United States, than at Vienna.

is given as an example of the disease when observed after scarlatina:—

First symptoms.—Facial dropsy; scanty and turbid urine, containing "*epithelial casts*" and blood, with a large quantity of albumen.

Successive phenomena.—Severe headache, convulsions, semi-stupor, involuntary fæcal discharges.

A patient of Dr. Johnson's, presenting all the above signs and symptoms, recovered after cupping over the region of the kidneys. Most cases of the sort would terminate in coma and death.

B. CHRONIC DESQUAMATIVE NEPHRITIS. (*Johnson.*)

Chronic Inflammation of the Anæmotrophied Kidney. (*Prout.*)

Néphrite Chronique. (*French Authors.*)

This form of nephritis often succeeds the acute, which, if neglected, thus becomes a direct *cause* of the chronic affection. In forming our opinion, we should learn the patient's antecedent history, both in regard to his habits and situation in life, his previous diseases—especially if of a renal nature; if chronic gout have existed, and whether the constitution is debilitated by excesses. When once this affection is established, a train of consequences ensues, leaving little doubt as to its true nature. As in the acute form, the blood becomes greatly depraved, which induces various disorders and grave structural changes. The following results are usually observed:—Anasarca, dropsy of one or more serous cavities; inflammation of the serous membranes; hypertrophy of the heart, with or without disease of the valves; excessive functional disturbance, or even structural change of the great nervous centres. First the prevention, and secondly the relief and cure, when possible, demand an early and very precise diagnosis. The acute disease will sometimes remit, or even appear to cease; there is then great danger that the chronic affection will follow. Occasionally, neglect of the former permits this accident. A patient ill with the acute disease should be forbidden the least exposure, lest the chronic, ensue. Insidious, often, in its onset, the attack may surprise both patient and physician. Apparent good health may be followed in a few hours by death from aggravated renal disorder, and necroscopy disclose extensive disorganization of the kidneys, evidently chronic. Often, our wonder is excited at the performance of function in such cases.

Serious cerebral symptoms, unexplained by inspection of the

brain, have found their cause in the condition of the kidney. An early recognition of this might have given the patient a chance. Perhaps the medical attendant was not consulted, the indisposition at first seeming slight, or the head symptoms were not referred to their real cause; perhaps a too tardy, or an insufficient analysis of the urine was made.

Causes as Diagnostic Elements.—Previous gout is decidedly causative. Dr. Todd uses the term "gouty kidney" to designate this form of nephritis. Another writer refers nearly all the cases to intemperance in drinking. Depression, anxiety, excessive physical or mental exertion; debilitating influences; deficient and indigestible food; impure air constantly breathed—all concur in developing or increasing the disease. Under these influences, the blood must become more or less depraved, and the result cannot be doubtful.

Precursory Phenomena.—Gradual loss of strength; emaciation; deficient exhalation from the skin, which is dry and of a sallow or even dusky hue; thirst; anorexia; sometimes voracious appetite, flatulence, pyrosis, vomiting. Dr. Johnson has noticed the frequent occurrence of epistaxis, which he refers to deterioration of the blood in consequence of "imperfect renal excretion."

Subsequent Manifestations.—Dropsical effusion may occur; it is not constant; a puffiness about the eyelids is often noticed quite early; it is usual at a later stage. Frequent micturition, from irritative properties of the urine, or from irritable bladder, may distress the patient. Litmus paper will usually show the urine at this period to be quite *acid*.

To base our treatment upon past influences or existing symptoms alone, is inadmissible. Chemical and microscopical tests must be promptly resorted to, or the opportunity for effective treatment may escape us. In chronic nephritis, blood is almost never seen in the urine; the opposite is true of the acute form. The longer the disease lasts, the less is the likelihood of observing hæmaturia. This negative fact has a certain importance.

¹ This designation has been considered inappropriate by some observers, who, however, fully recognize the frequent connection of gout and renal disease. In his recent work on *Medical Diagnosis*, Dr. A. W. Barclay says: "Gout is especially associated with disease of the kidney; and so frequently has this been observed, that some pathologists have spoken of the gouty kidney, a phraseology which is highly objectionable." (*Op. cit.*, p. 73. American edition: Blanchard and Lea, 1858.)

Epithelium is shed into the urine in a characteristic form; it is "granular, amorphous, disintegrated;" sometimes cylindrically shaped, but generally much scattered.

Albumen very rarely, if at all, exists in the urine in the first stage of the disease. The second period is gradually attained, unless remedial measures succeed at first. The urine is scanty; albumen appears in it, particularly if gout have been declared. If the gouty paroxysm remit, the condition of the urine improves. The *granular casts* (Fig. 2), seen by the microscope, increase with the albumen, and *vice versâ*. At last, the urine becomes permanently albuminous. From being quite abundant in the first stage, it is scanty, and may even be suppressed afterwards; the latter circumstance indicates a fatal termination. The solid constituents of the urine are notably diminished in the latter stages. Dr. Christison mentions cases in which they fell to $\frac{1}{8}$ and even $\frac{1}{12}$ of the healthy average. The impoverishment of the blood is doubtless one cause of this decrease. (Frerichs.)

In the third stage, "large waxy casts" (Fig. 3) appear in addition to the granular casts and disintegrated epithelium; they are of a "whitish," waxy hue, with a well defined outline; their diameter about $\frac{1}{8}$ of an inch, being nearly equal to that of the kidney tubes. (Johnson.) They are undoubtedly moulded in these tubes, deprived of their epithelial lining by desquamation.

Such is the course of nephritis in the chronic form, and particularly when associated with gout. In cases supervening upon an acute nephritic attack, the urine loses its natural colour and density; is loaded with albumen, copiously secreted, depositing an abundant, dense sediment, composed of granular casts, with scattered, amorphous epithelium.

So insidious is the disease, up to a certain point, that the utmost

Fig. 2.



Granular epithelial casts. (After JOHNSON.)

watchfulness of the physician, and extreme prudence on the part of the patient, can alone avert fatal disorganization. When there is only suspicion of renal disorder, or certain undefined sensations suggestive of it, the microscope may both reveal the cause, and enable us to save the patient.

Secondary Diseases.—These, when they occur, which is not seldom, may be, to some extent, corroborative of the rational signs and explanatory of certain symptoms. They are numerous, and often sufficient to compromise the patient's life. It is enough to specify dropsy, dyspepsia, diarrhoea, pulmonary disease, inflammation of the serous membranes, chronic rheumatism, coma and convulsions, disease of the heart and of the liver, to show the hopelessness of a case complicated with even one such affection.

Chronic vomiting is frequently combined with the dyspepsia attendant upon chronic nephritis, and if it occur alone, should lead to a critical examination of the urine before we refer it to gastric origin. The same is true of certain severe cerebral complications, sometimes promptly relieved by remedies directed to the kidneys.

Inflammations of the serous membranes are, if we except, perhaps, the cerebral disorders, the most common and disastrous of the secondary diseases.

Examination of the Blood.—1. In the chronic form of the disease, the serum is more abundant in proportion to the clot; the buffy coat less frequent; the clot small and firmly contracted; the fibrin natural in its proportions; sometimes abundant, when local inflammation exists.

2. The density of the serum and its solid contents are often at the healthy standard, and sometimes above; *vice versâ* in acute nephritis.

3. The colouring matter is rapidly diminished.

4. Urea in the serum; most abundant when the solids are reduced, in the urine voided. (Christison. Johnson.)

The latter points present a certain analogy to the appearances in the acute disease.

Pathological Anatomy as confirmatory of Diagnosis.—Certain necroscopic revelations may be mentioned. They become diagnostic means in so far as they fix in the mind the deductions of able observers, and corroborate the microscopic appearances.

1. Thickening of the arterial walls, often extreme, with a tortuous condition of the vessels themselves; the latter doubtless arising

from impeded circulation, consequent on disorganization of the renal tissue; this action likely to be reciprocal and increasing.

2. Malpighian capillaries thickened; sometimes narrowed; occasionally wholly "decayed or shrivelled."

3. Contraction of the larger inter-tubular veins, and atrophy (not constant) of the inter-tubular capillaries.

Consequences.—Obstructed circulation; subsequent fatty and other deposit, from a change in the stagnant blood; desquamative action, and consequent induction of the symptoms stated.

Diagnostic Indications derived from the Results of Treatment.—Certain cerebral symptoms (even convulsions and coma) have been subdued by revulsive treatment applied to the kidneys. The seat of the disease being thus indicated, we can at once proceed to its investigation, supposing the existence of some doubts previously.

In dropsical cases, Dr. Golding Bird has sometimes detected *urea* in abundance in the faecal evacuations produced by powerful doses of elaterium. In similar cases, renal disorder being before unsuspected, thorough examination in that direction should be instituted. Other inferences will not infrequently be drawn. When symptomatic revelations are obscure, tangible evidence may thus be secured.

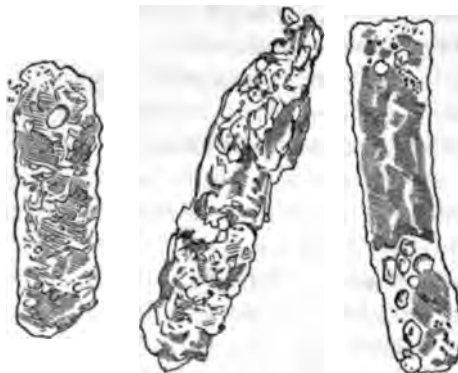
Summary of the usual Causes and Symptoms. *Causes.*—Wet and cold; grief and permanent depression of spirits; intemperance; hereditary gout; the acute form of the disease, especially when neglected; debilitating influences; over-exertion.

Symptoms.—Oppressed breathing; headache; emaciation; loss of strength and colour; puffiness of the face; gastrodynia and flatulence; epistaxis; dimness of sight; frequent micturition; dyspepsia; occasional emesis after meals.

Appearances of the Urine.—At first scanty, often of the "colour of porter;" later in the disease, pale; its specific gravity about 1.012; often two or more quarts in 24 hours; depositing a dense, whitish precipitate, in which are found granular casts, disintegrated and scattered epithelium; no blood or crystals usually; a moderate proportion of albumen. *Indications* from such symptoms:—rapidly progressing chronic desquamative nephritis.

In a fatal case narrated by Johnson, the above symptoms were all remarked, and "large waxy casts" (Fig. 3) were also seen in the urine, and were more abundant than the "granular casts."

Fig. 3.



Large waxy casts seen in chronic desquamative nephritis, waxy degeneration, and occasionally in other forms of renal disease.¹

II. WAXY DEGENERATION OF THE KIDNEY.

The symptoms of this affection are often those of acute nephritis; and the lesions observed may follow that disease or be wholly independent of it. We find the same causes active in its production, and both an acute and a chronic form are observed. Owing to the greater amount of obstruction in the convoluted renal tubes, circulation is more thoroughly and rapidly impeded; in the acute form, hæmorrhage is not infrequent. When chronic, an immense amount of "waxy" material may be found in the tubes; the degree of obstruction to circulation and excretion may be inferred. The poisoned blood thus retains much matter that cannot be eliminated, and the entire system soon sympathizes with the renal disturbance. The urine, when first passed, is pale; after standing for some hours, a light, cloudy sediment falls, in which the microscope discovers large waxy casts with small cells, or "abortive germs of cells," entangled with them; *no renal epithelium* nor any blood, or very rarely. Less urine is usually secreted than in health; in most cases it is highly albuminous.

The waxy casts, unmixed with epithelial desquamation, thus become the distinctive diagnostic sign of this affection, and although

¹ Their diagnostic value is dependent greatly on all the concomitant circumstances of the case in question.

sometimes associated with other forms of renal disease, it is easy to determine the cases to which they give their own character, exclusive of any other important sign.

III. NON-DESQUAMATIVE DISEASE OF THE KIDNEY.

There is no doubt that this form of renal disease exists, and that it is both acute and chronic in manifestation. Its title indicates its essential character: *an absence of desquamative action*. Most frequently there are no "tube-casts" of any sort in the urine; occasionally those termed *small waxy casts* (Fig. 4) are seen, and these may be numerous. Diagnosis, in this affection, is derived more from mingled evidence than in those previously noticed. In the acute form, the symptoms may be sudden in their appearance. General dropsy, with scanty and highly albuminous urine; no hæmaturia, nor even blood-corpuscles visible; dyspnoea, either from concomitant pulmonary disorder or from effusion into the thorax; continuous prostration in unfavourable cases. Dropsical effusion is often excessive in the advanced stages of the chronic form; there is rapid and great loss of strength; serious cerebral symptoms arise; the lungs are congested and inflamed, or the serous membranes suffer, and these concurrent attacks are usually very severe. The blood becomes greatly impoverished by the draining of albumen; and the uneliminated matter, continued in the circulation, adds momentarily to the existing mischief. The small waxy casts are sometimes seen by the microscope; these alone do not decide the nature of the disease, yet in the absence of epithelial shedding, and in conjunction with the specified symptoms, we can hardly mistake. These "small casts" are considered, in most cases, of favourable import.

In the chronic non-desquamative disease, the urine, when first passed, is clear—perhaps paler than when the patient is in health; there may be a cloudy deposit of pavement-epithelium from the bladder; usually, there is no sediment. The quantity of urine is less than in health, and often greatly diminished; its specific gravity

Fig. 4.



Small waxy casts.
(After JOHNSON.)

is variable, generally below par. Albumen, in nearly all cases, is excessive. Reaction, *acid*, ordinarily. No tube-casts nor renal epithelium; occasionally, scattered blood-corpuscles. Accidentally, a few crystals of triple phosphate or of lithic acid. The small waxy casts are comparatively infrequent, at least in great numbers, when the disease has been of long duration. The absence of epithelial tube-desquamation, and of large waxy casts (*which latter show that the epithelial lining is destroyed and replaced by the degenerated matter*), more than anything elucidates its nature. This form of disease, when uncontrollable by remedial means, may terminate in far more serious difficulty. Hence the very great importance of an early comprehension of its nature. Remedies can only be hopefully applied in the first stages, and the microscope gives us precise indications in the majority of cases.

IV. FATTY DEGENERATION OF THE KIDNEY. (*Johnson.*)

Bright's Disease.—Néphrite Albumineuse. (*Rayer.*)

Hydropisie Rénale; Albuminurie. (*Martin Solon.*)

Granular degeneration of the Kidney. (*Christison.*)

Different affections of the kidney have been described under the title "Bright's disease."¹ At present there are *two forms* which mainly comprise it. *First*, a rapidly developed disorder, the morbid deposit in the kidneys being excessive; the tubes of the cortical portion being gorged with fat, the entire gland enlarged, and atrophy of its substance probably never occurring; the vessels of the organ compressed; in most cases, obliterated over a great portion; extreme impairment of secreting function; nearly always irreparable injury.

Previous to the establishment of this condition, there is a stage of *congestive action*, but, as Johnson asserts, there must be a certain amount of deposit in the kidneys previously to this; the congestion manifested throughout the disease may be either active or passive.

Secondly, there is a form in which the kidneys are found, *post-mortem*, "granular and atrophied;" the deposit of fat is more slowly and less regularly made; some of the tubes, being filled, press like

¹ Termed by Dr. Bence Jones, "the most frequent disease of the kidney."

Fig. 5.



Hæmorrhage into Malpighian capsules compressing the tufts.

Fig. 6.



Tube containing some yellow granules, the remains of extravasated blood.

"prominent granulations" upon the surrounding parts, and an atrophied¹ state results.²

Fatty degeneration of the kidney is very likely to succeed the non-desquamative affection previously described. It is characterized by nearly the same symptoms as those of acute desquamative nephritis; occasionally, signs resembling chronic nephritis occur. The general symptoms in these diseases are often similar, and but for minute investigation, microscopically and otherwise, we might be confused. Mr. Simon and Dr. Prout confirm most of the investigations and deductions of Johnson, first published in vol. xxix. of the *Medico-Chirurgical Transactions*. These have been lately expanded and revised in the author's valuable treatise upon renal diseases. (London, 1852.)

In the *British and Foreign Medico-Chirurgical Review*, for Jan., 1855, Dr. Johnson, while reviewing a paper upon "Bright's disease," by Dr. Samuel Wilks (*Guy's Hospital Reports*, Second Series, vol. viii.), takes occasion to refer anew to the error committed by many in making this disease "single." Its title contributes to this result of a "oneness" of aspect. Dr. J. thinks the term is only properly applied to a *class* of cases whose existence and clinical history were first made known by Dr. Bright. He alludes to his former endeavour at refuting the erroneous doctrines of Reinhardt and Frerichs. The "subdivisions of Bright's disease" is the caption of

¹ Dr. Durkee, of Boston, distinguished for his microscopical skill, has lately informed us that, in successful injections of the kidney (a very difficult feat), he has found the Malpighian bodies become turgid and hypertrophied, and by their pressure, the tubuli uriniferi are narrowed in calibre; an artificial atrophy, so to speak. Analogically, if the Malpighian bodies become veritably congested, a *true* atrophy may arise from their pressure on the tubes.

² See Appendix, Note D.

this article. The reviewer states one great object of Dr. Wilks to be, to draw a broad distinction between the "well-known large white kidney" and the small contracted kidney; and while Dr. J. fully recognizes these two great forms, he thinks the "distinction" too marked, as made by Dr. Wilks, and adds that "the large white kidney is not infrequently a chronic disease, commencing insidiously, without exposure to cold, or previous occurrence of inflammatory symptoms, and sometimes even making considerable progress before the occurrence of dropsy excites a suspicion of renal disease." On the other hand, "in more than one case of *contracted* kidney, he has been convinced that acute dropsy in a previously healthy person" was the commencement of the trouble. The chief distinction between the two classes of cases, is that the large white kidney never proves fatal without previous dropsy, which latter is "one of the most prominent and distressing symptoms" when manifested; the small contracted kidney goes to the extreme limit of degeneration, and kills the patient "without giving rise to dropsy in any form or degree." In "large white kidney," the urine is *less* in quantity than in health, and highly albuminous; its specific gravity ranging from 1.015 to 1.030, and rarely below the former; while in the "small contracted kidney," the rule is that the urine is considerably *above* the normal quantity and less albuminous than in the class of cases of the opposite description; its specific gravity is more frequently below than above 1.015, and may fall to 1.010 and 1.005. Heat, Dr. J. remarks, is decidedly a more delicate test than nitric acid, for very small quantities of albumen. Nitric acid sometimes decomposes an amount of albumen which would be easily detected in *acid* urine, by heat carefully applied. The term "chronic desquamative disease" is still advocated by Dr. J., for the form which results in the small contracted kidney; and when no sediment is observed in the urine, or only a light cloud subsiding after stasis, the term chronic non-desquamative disease is applied. When oil appears during life, and fatty transformation is found *post-mortem*, he knows no better designation than "granular fat kidney." His views, we are glad to observe, are almost precisely those set forth in his large work.

The previous history of the patient should command our first attention. Any former tendencies to renal disorder must be noted. We next carefully examine the urine. *Albumen* is always present, and the specific gravity is diminished. Often, albuminuria is exces-

sive. The colour of the secretion is nearly natural; it is clear, free from sediment; contains neither renal epithelium nor tube-casts (very infrequently, some of the "small waxy casts," previously mentioned, may be seen); *oil-globules* will next appear, and when "casts" are present, the globules adhere to them at first, and separate globules are visible. As the disease progresses, the fatty material is more and more abundant; "degeneration" is at last complete, without the possibility of any reparative process.

The "mottled fat kidney"¹ answers to the first of the "forms" of this affection already referred to; the "granular fat kidney" to the second. The last form is most commonly observed, *post-mortem*. Diagnosis by microscopic examination of the urine is confirmed by necroscopic chemistry. The granulations of the renal tissue, and the globules observed during life, "are entirely removed by digestion in ether." The fatty particles, when very small, fuse on the application of heat, and become large drops of oil or "grease." The entire reliance to be placed upon microscopic revelations during the lifetime of a patient is thus shown. Dr. Tanner mentions a case wherein "non-desquamative" disease had existed for many months before there were any signs of fatty degeneration. Dropsy first appeared, with highly albuminous urine; no casts nor renal epithelium; after several months, "waxy casts," then oily casts and cells. Death from exhaustion. So long an interval between the two diseases is unusual. The importance of an early microscopic examination is evident, as also is the necessity for the strictest watch for renal symptoms.

When once established, the disease induces hyperæmia and hypertrophy in variable degrees; the latter is gradual, but sure, in the first form; the explanation of the atrophied condition has been given. When the kidney is rendered heavy by the morbid changes mentioned, we may reasonably refer much of the sense of weight and uneasiness about the loins to this cause. Heat in the lumbar region is often annoying. The kidneys are frequently found hæmorrhagically spotted and softened; the Malpighian capillaries opaque and thickened; so complete is the disorganization, that it is wonderful how the patient could so long exist, and why the physi-

¹ It is, at times, large and uniformly *pale* (large white kidney); and in its mode of access, often very insidious.

cal distress had not been greater, and the state of general *malaise* no sooner set up.

Œdema of the *eyelids* should early arrest the physician's attention; the face is next invaded, then the extremities; the skin has a peculiar dryness, and lumbar pains soon follow, with feverishness, diarrhoea, vomiting and debility. Epistaxis has been remarked by Dr. Todd as frequent, especially in the chronic wasting and contracting kidney.¹ Nitric acid will show, at this period, albumen in high proportion: Christison has noted it 14 parts to 1,000; the largest amount, we believe, yet observed. Heat usually reveals albumen in nearly all specimens. There are, about the above mentioned epoch in the disease, either marked exacerbations, with intervals of comparative ease, or else a quiescence, for some time. When new accessions or aggravations occur, the urine may be slightly sanguinolent. Although albumen is seen in many other renal diseases (especially whenever there is pus or blood² in the urine), yet it is peculiarly distinctive, by its *amount*, in fatty degeneration. The urea and constituent salts are in less quantity than natural. Dalmás points out the value of these facts thus:—

¹ Dr. J. H. S. Beau, Médecin des Hôpitaux, agrégé à la Faculté de Médecine de Paris, etc., found *carotid murmurs* very marked, in ten out of twelve cases of Bright's disease. (*Archives Gén. de Médecine*, January, 1846.)

² Becquerel remarks the frequency of blood in the urine in the first stage of "Bright's disease."—"If fibrinous moulds of the ducts are found by the microscope with blood, there can be no doubt that the blood is caused by congestion of the cortical structure of the kidney; and if this constantly exists, Bright's disease is present, and the low specific gravity and excess of albumen in the urine will generally help to confirm this deduction; the history of the case always being well considered." (Bence Jones, *Animal Chemistry*, Eng. edit., p. 138.)

Dr. George Robinson, of Newcastle upon Tyne, enunciates the following proposition as, in his opinion, explanatory of the production of albuminous urine, in nearly every case in which it is observed, viz: "*That the presence of albumen in the urine is produced by, and its proportional quantity is in a direct ratio to the degree of, congestion of the capillaries of the kidney, from whatsoever cause that congestion may arise.*" He illustrates his position by certain experiments upon animals, and which, so far as they go, confirm his opinion.

Dr. R. refers to the different conditions in which albuminous urine is observed; as, obstruction of the circulation through the abdominal and renal veins, producing congestion; peritonitis; the crisis of fever; certain cutaneous affections; pregnancy; pneumonia (Solon); hypertrophy of the heart with valvular obstruction (Fourquet); chronic inflammation of the liver (Graves); phthisis; diabetes; etc., etc. (See a collection of papers entitled "*Contributions to the Physiology and Pathology of the Circulation of the Blood*," by George Robinson, M. D., etc. London, 1857.)

VIA BELLE

"Ainsi, que dans une maladie du cœur avec urine coagulable, on ne sache si le rein est affecté ou non, l'analyse chimique décidera bientôt la question. Dans le premier cas ('maladie de Bright'), la composition de l'urine sera profondément altérée; dans le second, il y aura seulement addition d'un peu d'albumine." (*Dict. de Méd.*)

So far as we are aware, no distinctive difference exists in the symptoms declarative of the two forms. Nor have the characteristics of urine from the "mottled fat kidney" been found to differ essentially from those of the "granular" variety.¹ In the mottled kidney, the urine is fully charged with albumen, the secretion is scanty (in both forms, *very early*, it may be copious, and diminish slowly), and of a natural colour when first passed; when allowed to stand, there is a "slight cloudy sediment, in which may be found some small waxy casts, entangling oil-globules, and also oil in cells." Johnson believes that oil is, sometimes, not found in the

Fig. 7.



Oily casts and cells. (After JOHNSON.)

urine when this form of the disease exists. His explanation is, that in the granular form many of the tubes contain a number of detached oily cells, readily washed out by the stream of urine passing

¹ The chief difference exists in the relative quantity passed, and in its specific gravity; the above statement may be modified somewhat. (See note, page 50.) This, however, does not always obtain.

through them; while in the "mottled" kidney, there is usually only a single layer of epithelium remaining adherent to the basement-membrane. The escape of cells is thus hardly possible; nor could oil be discharged except by rupture of the cells—a very rare occurrence.¹ The escape of fibrinous material coagulated in the Malpighian bodies, might cause oil from the ruptured cells to pass into the urine. When not observed in the urine, the diagnosis becomes somewhat obscured. Close investigation of the concomitant symptoms and due appreciation of the frequent, remarkable changes in the *digestive organs* will greatly assist us, often will be quite sufficient. The "granular" form of this affection is most common after non-

Fig. 8.



Portion of a tube filled with oil-globules. (After JOHNSON.)

desquamative disease—the urine being clear and without sediment; this second form is often gradual and very insidious in its approach, and may have made large inroads upon the renal substance before any indications, by the urine or otherwise, are manifest. The rarity of the non-appearance of oil-globules (Fig. 8) in the urine, when fatty degeneration of the "mottled" form exists, is so great, that diagnosis will not often be thus embarrassed. In no affection of the kidney is an early and continued microscopic examination of the urine more essential to the establishment of a correct diagnosis,

upon which depends the patient's small chance of cure. Fatty degeneration of the kidney is not infrequently met with after typhus

¹ We have heard it stated by Dr. J. B. S. Jackson, and have seen the experiment tried, that, in many instances of examination of kidneys proved by the microscope to contain oil or fat, on slicing a thin portion, laying it on white paper, and applying heat (as in testing fatty liver), the slice curls and dries into a hard, horny layer, without leaving the least trace of grease upon the paper. This is certainly remarkable, and not what we should expect. On the same authority and that of Dr. Calvin Ellis, of Boston, it is pronounced rare to meet with the "large white kidney;" one had seen only a single instance; the other only "a few," out of a very considerable number of dissections. In this opinion, the best English observers concur; they say it is "comparatively rare." Both remarked the frequently insidious course of the malady, and that it is sometimes found well advanced in the kidneys of those who die of other diseases, or by accidents. Fatty degeneration (to a certain extent) has been found in diabetic patients, and none in Bright's disease. Exceptions prove the rule, generally.

fever. Any suspicious renal symptoms arising at such a time should be carefully traced. An interesting case is related by Johnson, of fatty degeneration following immediately after venereal excesses and probably induced by them. First symptoms: general dropsy, bloody and oily urine; subsequently, clear urine, highly albuminous, with oil-cells; disappearance of the dropsy; the general health not much affected. The account of the case is imperfect, but its *reputed cause* is worth noting. Debility thus induced would be a powerful influence.

Dr. Lionel Beale (*Archives of Medicine*, No. 1, pp. 8, 9, London, 1857) has some interesting observations upon the presence of *cholesterine* in the urine in cases of *fatty degeneration* of the kidneys. Dr. Beale states that he first referred to the fact of this substance appearing in the fatty matter accumulated in the epithelial cells thrown off in the above disease, in 1852. He speaks also of the detection of cholesterine in urine, mentioned by Simon in his *Chemistry*, and of the two instances in which it was observed by Gmelin and Möller; the former having seen it in a case where the flow of bile was impeded, and the latter in *kiesteine*, which sometimes contains much fatty matter. These are also quoted in Simon's work, from *Caspar's Wochenschrift*, January 11th—18th, 1845. Dr. Beale also alludes to the assertions of other authorities, Lehmann amongst them, to the effect that cholesterine has not been detected in the urine.

In Dr. Beale's paper, the process for detecting cholesterine is given, and certain of the instances in which he had found it are detailed. He also remarks that he had discovered it in "the fatty matter of so many organs in a state of fatty degeneration, as to justify the conclusion that the formation of this substance is intimately connected with the changes taking place in this morbid process." Cholesterine, according to this observer, when occurring in the urine, "is always dissolved in other fatty matters, so that its presence cannot be detected, except by extraction with alcohol and subsequent crystallization. It forms a part of the constituents of the minute fat-globules contained in the epithelial cells and casts of the uriniferous tubes, which Dr. Johnson has proved to be so characteristic of this form of kidney disease." The reason that the oil-globules, in these cases, sink to the bottom of the vessel, when they might be expected to float, is believed by Dr. B. to be in some measure owing to the amount of cholesterine contained in the fatty

matter. "Crystals of cholesterine sink in fluids of a specific gravity even some degrees above 1.000." The cell-walls and casts are not the sole reason of the sinking of the globules, since certain of the latter, free from such encumbrance, sink as well as the others. Dr. Beale has never "been able to detect cholesterine in the urine in any other morbid condition than in that above referred to." He is inclined to believe it "a constituent of the fatty matter present in the urine in all cases of fatty degeneration of the kidney." He has seen it, besides, in the "*granular corpuscles* containing oil-globules, which are abundant in the fluid of *ovarian dropsy*, and sometimes in *hydrocele*, and in that found in cysts generally;" also in similar cells in *sputum*; in those which are numerous about the small cerebral arteries in cases of "*white softening*;" in the so-called *fatty degeneration of the placenta*, etc.

A large quantity of urine is necessary in order to make a satisfactory analysis. The difficulty of obtaining so much, has, as yet, limited Dr. Beale's observations to four. The process is as follows: "The deposit from upwards of seven gallons of urine was collected upon a filter; it was dried over a water-bath, and digested in a mixture of alcohol and ether. The solution was filtered, and after being concentrated by evaporation was allowed to cool. Crystals of cholesterine were formed in considerable number. These were subjected to microscopical examination. The fatty material was found to be composed of at least three distinct forms of fat, but in consequence of the very small quantity obtained for observation, it was not possible to examine their characters very minutely." In the above specimen of urine there was: 1st. A dark brown fat, in very small quantity, soluble in ether, insoluble in hot and cold alcohol; 2dly. A light brown saponifiable fat, soluble in hot, but not so in cold alcohol; 3dly. "A considerable quantity of pure cholesterine, which originally existed in the urine, dissolved in the other fats." (*Loc. cit.*)

Dr. Thudichum showed some *sarsine* obtained from urine, to the Medical Society of London, January 9th, 1858. "The *sarsine* was precipitated by acetate of copper, from urine rendered alkaline by milk of lime. He (Dr. T.) had found *sarsine* in very large quantities in the urine of a patient affected by Bright's disease." (*Lancet*, January 16th, 1858.)

Dr. Prout remarks that inflammatory attacks of the kidney in all the forms and stages of degeneration, are usually ushered in by

the common symptoms of fever.¹ As would be supposed, febrile action is strongest in cases of "*inflamed hæmotrophied² kidney*." To the causes already named, this author adds the incautious use of instruments in diseases of the bladder; inflammation may thus be propagated from that organ to the kidney. Rigor, pain in the back³ and head, restlessness, hiccough, with great thirst and a typhoidal aspect pervading the disease, are of the worst augury. Age very sensibly affects these phenomena; a more indolent character stamps them in old persons, while inversely as to years, they are more acute. The stomach, in early life, the abdominal organs below it, afterwards, are liable to be sympathetically affected when renal disease exists. In hæmotrophic affections (especially when inflammation accompanies) there are dyspeptic disturbances, very often connected with hepatic disorder and deranged function of the abdominal viscera, while *activity* distinguishes the anasarca which may be developed; the opposite is true in anæmotrophied kidney, if inflamed; the action is but indolent, the dropsy "cold and passive." Hæmotrophic effusion prefers the great cavities; anæmotrophic dropsy is more likely to assume the anasarca form. These general considerations are of great diagnostic value.

There is much analogy between fatty degeneration and acute and chronic desquamative nephritis. They are occasionally combined, and, as we have seen, their symptoms often do not essentially vary. Differential diagnosis, however, is usually attainable.

Renal Cysts.—Cysts of the kidneys are so frequently observed in connection with obstructive disease of the organ, that a passing reference should be made to them. Simon believes them to be the result of acute inflammation of the renal substance, but considers

¹ Becquerel remarks the febrile state to be far from characteristic of Bright's disease; it is, in his opinion, exceptional, unless there be some inflammatory complication. (*Sémiologie des Urines*.)

² The terms hæmotrophy and anæmotrophy simply imply a *deficiency* or an *excess* in the *supply* of blood—the *nourishment* of the organs. Atrophy and hypertrophy relating to *magnitude*, and anæmia and hyperæmia to mere *quantity* at any one time, the first term was rendered necessary, and is employed chiefly by Dr. Prout, in his work on Renal and Stomach Diseases.

³ "Pain in the loins is the exception in cases of Bright's disease." (Johnson, Wilks; *Med. Chir. Review*, January, 1855.) In some acute cases, there is severe pain in the region of the kidneys; but in chronic cases none; so that patients "urge this fact on our attention," doubting if an organ so free from pain can be so seriously diseased. (Johnson, *loc. supra cit.*) The author renews his strong assertions of confidence in the microscope.

them "a vesicular transformation of the ultimate structure of the gland;" that they are "a new secretory apparatus," compensatory, somewhat, for the obliteration of renal tissue. Johnson supposes them to be "dilatations of the urinary tubes, when denuded of their epithelial lining." Prout thinks both observers are right, at different times—the cause not being uniformly the same.

These cysts have a range of size from that of a mustard-seed to that of a cocoa-nut. Often, the microscope alone can detect them. They are seen in the urine; sometimes strung together like beads, and otherwise agglomerated. They have been observed in malignant diseases, oxalate of lime appearing with them; in cutaneous affections; in hypochondriasis and insanity. In most cases, the urine is not serous, nor otherwise indicative of renal disease, yet the kidneys can hardly be entirely healthy. Dyspepsia, great flatulence, much hepatic disturbance,¹ with irregular pulse, were noticed by Prout in one case, but no organic difficulty was discovered; the urine was not serous—its specific gravity was between 1.022 and 1.032; it was abundant; mingled lithic acid and oxalate of lime crystals were noticed, with numerous and well marked *cysts*. There was insanity, and had been suicide, in the patient's family.

V. SUPPURATIVE NEPHRITIS.

A. FROM DISEASE OF THE BLOOD, DEBILITY, ETC.

There are several causes, unusually suggestive of diagnosis, to which this disease may be referred. A depraved condition of the

¹ In a case reported by Dr. Bristowe in the seventh volume of the *Transactions of the Pathological Society of London*, p. 229, there was cystic disease in the liver, and also in the kidneys. This account is cited by Dr. Beale, in the *Archives of Medicine*, No. 1, pp. 31-2, who, in addition to the facts relating to this "very uncommon disease of the liver," gives the following statement from the paper relative to the kidneys and urine:—

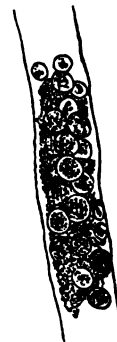
"The urine became bloody five weeks after the commencement of his illness, and continued so up to the time of his death. Dr. Bristowe could only obtain this somewhat unsatisfactory history of the case. The kidneys were enormously enlarged, and also contained numerous cysts; 'one kidney weighed two pounds seven ounces and a quarter, and the other two pounds and three-quarters of an ounce.'"

The patient was a man fifty-three years old, whose health had been good until "within ten weeks before his death, when he was attacked with severe pain in the epigastrium and right side, supposed to depend upon pleurisy."

blood gradually modifies the renal secretory action, and the epithelial cells are converted into pus. In debilitated constitutions, either from devitalization of the blood, or by excess coupled with deprivation, this form of nephritis may arise and run a very rapid course. The suppurative process, once established, hardly admits of arrest. Dropsical effusion, with albuminous urine, first appears, and may sometimes follow chronic desquamative nephritis. If, particularly in the intemperate, boils and carbuncle are seen, renal symptoms should be watched for, and the urine carefully examined. Frequent micturition is remarked, and often most at night. Dropsical swelling may begin at the ankles, and ascend, instead of first appearing in the face. The urine is acid, pale and limpid; subsequently, very albuminous; its specific gravity ranges from 1.010 to 1.015. After a time, the microscope detects *moulded pus*—the “tube-casts” of Johnson (Fig. 9): a certain amount of diffused, unmoulded pus is also observed. It is important to ascertain the presence of the “casts,” as indicative of the source of the pus. At a later stage, true abscess forms, and then the distinctive tube-cast is lost, owing to the extent of disintegration. The importance of an early resort to the microscope is manifest. This instrument often detects pus in the urine when the constitutional disturbance is scarcely, if at all, noticeable. Necroscopic examination shows, in certain of the uriniferous tubes, the moulded purulent matter; in others, recent epithelium. The usual appearances resulting from chronic desquamative nephritis are noticed whenever that has existed. The value of the observations made during life is thus confirmed.

The affection is often first announced by the condition of the urine. If the patient have been exposed to cold and wet, or to other sufficient primary or accessory causes, slight anasarca, with pain in the loins and back, may be present. The urine is then, almost invariably, albuminous; and if purulent casts be found in it, the diagnosis is complete. At times, pus-corpuscles, without the fluid portion of ordinary purulent matter, are seen; we thence infer purulent infiltration of the renal tissue, but not actual abscess. It is asserted that these cases are distinguishable by the *large size* of the corpuscles, both in the casts during life, and in the tubes after death. When large, and destitute of fluid portion, that form

Fig. 9.



Purulent cast.

of the disease exists which obstructs the tubes alone; when smaller, and accompanied by diffused pus, renal abscess is probably present.

Johnson has observed a cell, which, instead of the compound nuclei characteristic of the pus-corpuscle, had only a single nucleus, like that of an epithelial cell. In this case, the urine was dark-coloured, scanty, albuminous; there was anasarca, ascites, and tuberculous disease of the lungs. It would seem that, although suppurative in its essence, there was some acute inflammation previously, probably desquamative, and set up for eliminatory purposes. There is, in this class of cases, evident complication of hepatic with renal disease.

The bladder, if sympathetically irritated, will throw off epithelium, and often a few pus-corpuscles; the latter are scattered, or in clusters, "never moulded into tubes." A "purulent cast" rarely occurs in the forms of nephritis hitherto considered. Suppuration does not uniformly follow even violent desquamative action.

In distinguishing between suppurative nephritis and cases in which the bladder furnishes the pus, we rely both upon microscopic investigation and general constitutional signs. The phosphatic diathesis is commonly present when vesical disease exists. The triple phosphate is found in abundance in the urine; and no tube-casts are seen in the purulent matter. Renal disease, however, may accompany the phosphatic diathesis. If the urine be free from albumen, or only slightly coagulable, by reason of the purulent secretion from the bladder, we may conclude that the kidneys are unaffected. If very albuminous, abnormal as to quantity, of low specific gravity, dropsy existing, renal disease is to be feared. The presence of purulent casts would settle the question. Efforts to correct the alkaline condition of the urine, and to remove the phosphatic deposit, would, if successful, confirm us in supposing the non-existence of suppuration in the kidneys, and put us upon the right track for treatment. Suppurative renal and vesical disease do not very frequently coexist.¹

¹ The gangrenous state into which the kidney may fall *after suppuration*, also happens in certain typhoid and cerebral disorders; it may possibly be betrayed by the odour from the urine. The constitutional state is too grave for remedy.

Dr. Robert Bentley Todd (*Clinical Lectures on Certain Diseases of the Urinary Organs, etc. etc.*, London, 1857) gives the following classification of those cases in which a large quantity of pus appears in the urine:—

"1. Cases of affection of the bladder in which the pus is secreted by its mucous

B. FROM EXTERNAL VIOLENCE.

This may be considered rare. The blow or fall must be very violent actually to cause so serious trouble, unless the individual be exceedingly feeble, or predisposed to nephritis. Johnson relates only one case. The attack was induced by a violent blow over the loins received by a gamekeeper in a struggle with poachers. Hæmaturia followed the injury, and pus subsequently appeared in the urine. There was very severe pain. The purulent discharge persisted for more than a year, and the man died from exhaustion. The right kidney was destroyed by the suppurative process; the left was sound. The patient was a strong man, in the prime of life. The lesion must have been very grave.

In a case somewhat similar, the same author saw blood moulded in the form of the uriniferous tubes; he hence inferred the source of the hæmorrhage. Purulent tube-casts are not likely to be seen except at the very commencement of the suppuration; afterwards, when a large part of the kidney is broken down, and an abscess formed, this diagnostic sign fails us.

Abscess in the kidney may be suspected, if dull pain in the loins and repeated shivering follow the symptoms of nephritis. Immense quantities of pus are discharged when the abscess bursts into the ureter. Recovery may take place after the exit of pus by an opening in the loins. A collection of pus in some neighbouring organ may open into the ureter and discharge itself with the urine. Psoas abscess has taken this course, and a specimen illustrating the fact is preserved in King's College Hospital, London. The cellular tissue of the pelvis may be the seat of abscess after parturition, and communication may be established with the bladder. In these cases, diagnosis must be based upon the previous history and concomitant circumstances. The situation of pain and swelling will often prove indicative.

membrane, as in simple cystitis, or in that caused by retained urine, or by the presence of a stone, or by some constitutional cause, as gout.

"2. Cases in which the pus is secreted by the mucous membrane of the pelvis and infundibula of the kidney—cases of pyelitis.

"3. Cases in which the pus comes from the substance of the kidney itself, in consequence of the existence of abscess. To these may be added cases in which pus comes from the ureter; but this is an affection seldom isolated from pyelitis, or from inflammation of the mucous membrane of the bladder." (*Op. cit.*, p. 398.)

Hectic symptoms sometimes announce the supervention of suppuration in the kidney; there may also be extreme irritation in the urinary passages from the contact of the pus. Dull pain, with a sense of weight and fulness about the loins, accompanied by gastric disorder, are noticed.

Two cases of much interest have lately been published, one by M. Guerra, the other by M. Luciani, both Italians, and which may be appropriately mentioned in this connection. The first was entire subsidence of an abscess of the forearm, the result of an injury, after *profuse discharge of pus by the urine*. The case by Luciani was the complete disappearance of a pleuritic effusion immediately after the appearance of purulent matter in the urine. The urine, as nearly always is the case, contained much albumen. In the latter instance, was the thoracic effusion of purulent nature? Of course, in like rare cases, renal disease would not be thought of; whether metastatic or not, the discharge could hardly accuse the urinary organs, especially after the use it made of them!

VI. NEPHRITIS FROM RETENTION OF URINE.

Stricture of the urethra, a frequent cause of retention of urine, may induce inflammation or cause its propagation from its own neighbourhood. Enlargement of the prostate gland is sometimes an equally effective agency. If pus bathe the urethral surface, the bladder and ureters will become inflamed by extension of the affection, and by mechanical obstruction; distension of the ureter is succeeded by that of the cavity of the kidney, and which may so increase as to form a large membranous sac. In a specimen described in the *Records of the Boston Society for Medical Improvement*, by Dr. Gay¹—the kidney, with its pelvis, was dilated into a thin cyst about the size of the fist; was somewhat sacculated internally, but without any trace of renal structure; the ureter being of about the usual size, but ending in a cul-de-sac, about one inch from its origin. The case was one of hydro-nephrosis; the symptoms, if any existed, are not given, nor, indeed, could they be known, the subject having been found in the dissecting-room. It at any rate serves to show a state of things that may, in rare in-

¹ December, 1851. See *American Journal of the Medical Sciences*.

stances, exist congenitally, but is oftener the result of inflammatory action and obstruction.

VII. PYELITIS.

Under this title M. Rayer has described the inflammation of the mucous membrane lining the renal cavities, and which frequently accompanies or follows stricture. The best observers adopt the term, and sanction his description.

Neither chemistry nor the microscope assists us in this affection. The urine may be coagulable, because it contains pus; there is, therefore, no actual proof that much, if any, albumen is present. The pus secreted by the kidney will not be of the distinctive *tubular* form. Indeed, from the gradually retrograding mechanical action of the pus, the tubes become destroyed from *before backwards*, and consequently cannot furnish the casts.

If the urine be very scanty, and of low specific gravity, suspicion would be justifiable. Drowsiness and other cerebral symptoms are still more significant. Vomiting, with dry, brown tongue, &c., indicate probable poisoning of the blood by urea—or, as is now believed by high authority, by the *decomposition* of urea in the blood, and the formation of carbonate of ammonia. Typhoidal symptoms are almost sure to follow. Sometimes the latter are the first intimations of *serious* renal difficulty. Pain and tenderness over the kidneys, it is true, nearly always exist, but are often out of proportion to the actual amount of disease.

Pyelitis may arise under many other conditions than those of urethral stricture. Catarrh of the bladder and the sudden checking of gonorrhoea by astringent injections are among the causes. A sense of heat in the back, with nausea and sympathetic irritation of the testicles, often announce and accompany the affection. When the latter is complicated with disease of the substance of the kidney, the urine being serous, the morbid sensations are often referred to the neck of the bladder, and are not much felt in the renal region.¹

¹ Prout.

The late lamented Dr. Golding Bird, in addition to acute rheumatism, and valvular disease of the heart, jaundice, and irritable stomach, had pyelitis and calculus. There had been anasarca of the feet and face; and about fourteen days

VIII. NEPHRITIS FROM RENAL CALCULI.

The existence of calculus within the kidney is usually declared by more or less severe pain in the region of one kidney; this sign is nearly constant, and accompanied by a sensation of burning heat near the seat of the pain. Tenderness on pressure is occasional; sometimes the pain is relieved by pressure over the part. Frequently it has an intermittent character, although we have observed this in one or two instances to be rather characteristic of calculi when passing from the kidney through the ureter. Cases are mentioned in which no pain in the kidney or ureter ever existed, although renal concretions were frequently passed. This must be exceedingly rare, for a *very small* concretion has caused intense pain. Pain and swelling of one testicle, and numbness extending down the thigh, are among the first and most prominent symptoms, accompanied by nausea and vomiting, which latter is often excessive, while the renal concretion is making its passage downwards to the bladder. We have witnessed, at such times, the most fearful agony, hardly quelled by large doses of opium. A striking analogy to the passage of gall-stones may be here remarked.

Differential diagnosis of these cases is not always easy. Generally, however, an attentive study of the antecedent history and existing state of the system will admit of correct conclusions.¹

Nausea and vomiting are frequent symptoms, arising from sympathetic irritation; they may, however, be wholly absent. Hæmaturia is a more constantly observed symptom.² It is said that the

before death, the urine suddenly decreased in quantity, and became mixed with blood. There was much pain at the neck of the bladder. Ultimately the urine was highly charged with pus; at times it seemed almost wholly pus. (*English Medical Journals.*)

Dr. Bird's case adds another to the list of distinguished medical men who have fallen victims to the very diseases the knowledge of which they did so much to advance. Laennec died of phthisis; Corvisart of disease of the heart, &c. &c.

¹ See Appendix, Note E.

² In microscopic examinations of urine containing blood, if uric acid or oxalate of lime crystals are found, the specific gravity being high, and fibrinous moulds wanting, it is most probable that a calculus exists in one kidney. (Dr. Bence Jones, *Animal Chemistry.*)

mulberry calculus occasions more profuse and frequent bleeding than the other varieties; its almost invariably rough and pointed surface must cause more laceration in passing, than the smoother stones. These calculi, however, have existed without giving rise to any hæmorrhage. A constant sensation of soreness, heat, or chilliness about the spine, loins, or sacrum, often aggravated by pressure, has been termed an "equivocal symptom;"¹ it has great value in certain instances, and in a lately observed case we can testify to the "constant soreness and heat;" the "chilliness" was not remarked. *Tinnitus aurium* is not uncommon; frontal headache, referrible to no other cause, we have observed. Active exercise increases all the symptoms of renal calculus; this fact has its diagnostic value. Rest brings remission of the morbid manifestations. A curious phase of the affection has been noticed; *continuance* of exercise has apparently altogether removed the paroxysm of suffering which it at first aroused; if nausea be excited, it passes off also. The sympathetic pains about the back and loins are often deceptive, and have even been proved to have been manifested upon the side *opposite* to the one where the calculus was. A seton has even been placed over a sound kidney, under these circumstances! This can hardly be a frequent occurrence; there is a reality in the cause which generally makes itself felt in its own locality. Certain neuralgic shootings in the back and loins may simulate the signs of renal calculus. If the patient be neuralgic in other parts of the body, we refer the lumbar pains to similar action.

Passage of the Calculus downwards.—If the concretion be of sufficient size to touch the walls of the ureter, or lodge in it, occasionally, while in process of transmission, there is excruciating pain shooting along the track of the ureter to the groin, and even to the testicle; the cremaster muscle contracts spasmodically; nausea and vomiting, with coldness of the extremities, supervene; the face is pallid; the pulse feeble; collapse is induced. Syncope and epileptiform convulsion are sometimes concomitant of these attacks. Frequent urination, and, generally, bloody water are observed. When the calculus enters the bladder, the relief is complete; extreme exhaustion follows. Tenderness along the ureter continues for a while, if the stone is large—the testicle of the same side being swollen and sore to the touch.

¹ Prout.

By chemical and microscopic examination, we ascertain the peculiar diathesis existing. If the urine be highly *acid*, and show a sediment of uric-acid crystals, the calculus is undoubtedly of the same nature. If the octohedral crystals of oxalate of lime appear, the mulberry calculus may be suspected. The kidney, however, may contain a stone, and yet no sediment exist in the urine. A concretion may remain for a long time quiescent, and, no pain having occurred, attention would not be called to the condition of the urine, and thus anything likely to induce calculus would escape notice. A crystalline sediment may be manifested, as is well known, wholly independent of renal calculus. The history and the general and local symptoms of each case are primary elements of diagnosis, while the minuter investigations mentioned are but adjunct. In the kinds of nephritis hitherto considered, the opposite is true in nearly all cases.

Gouty and rheumatic persons who have indulged in malt liquors, port and acescent wines, have, not infrequently, symptoms strongly simulating those of renal concretion. (Brodie.) The urine is high-coloured, scanty, frequently passed, with scalding of the urethra; pain in the small of the back, irritability of the bladder, abundant deposit of uric acid and urate of ammonia, are added, and may reasonably excite suspicion of stone in the kidney. The pain, however, contrary to that attending renal calculus, is unaccompanied by nausea and vomiting, and is very quickly relieved by treatment; nor does it recur with the pertinacity of that resulting from stone; it is not confined to one side, as calculous suffering usually is, from the fact of the extreme rarity of stone in both kidneys simultaneously.

Colic at times closely resembles the phenomena of renal concretion. But, in the former, the dragging sensations in the testis and shooting pains along the thigh are wanting. Yet medical men are often puzzled, and have been mistaken, in the diagnosis of these cases.

Dr. Watson (*Practice of Physic*) refers to a well educated surgeon, who firmly believed himself the subject of colic, until a calculus, passing *per urethram*, undeceived him. Dr. W. had adhered to his first opinion—that a renal calculus was traversing the ureter.

The distinctive sign of hæmaturia, in these cases, is that the blood is not moulded in the form of the tubes, as is seen in certain instances of renal bleeding from other causes.

Lithic acid concretions cause the least pain, and its character is dull and heavy; hepatic derangement accompanies; oxalate of lime concretions often produce excessive suffering and constitutional disturbance.¹ We lately observed a case of this nature confirmatory of the statement; there was agonizing pain, shooting upwards and downwards (chiefly the latter), and changing its seat as the stone descended, until an oxalate of lime calculus was voided, during micturition, and perfect relief immediately followed. The cystic oxide calculus is often the cause of great distress. Phosphatic depositions are often characterized by a sense of burning heat in the back, with severe and paroxysmal pain. Flatulence, gastrodynia, and palpitation of the heart, more peculiarly attach to the oxalate of lime; a general irritability of the system belongs, almost uniformly, to the so-termed oxalic acid diathesis.²

Suppression of urine is an occasional accident; coma and death are then common. The calculus is found to be large in these instances, and probably has long lain quiescent in the kidney, and at last been dislodged by some sudden, violent effort, blocking the ureter completely. Large conglomerations of the phosphates occasion *alkalescence* of the urine; if this be excessive, it becomes decidedly indistinct of their presence. Sour perspiration, headache, urticaria, with attacks of extreme indigestion, and great mental depression, often occur when phosphatic deposits abound.³

When a stone becomes impacted in the ureter, that canal becomes more and more dilated into the form of a sac, which may be so voluminous as to fill a large portion of the abdominal cavity, and induce suspicion of ascites. Diagnosis is alone attainable by careful discrimination of the general symptoms, and by exclusion of certain affections, but is attended with unusual difficulty.

IX. TUBERCULAR OR SCROFULOUS DISEASE OF THE KIDNEY.

This is a rare affection, *idiopathically*. M. Rayer, who gives many facts concerning it, agrees with the other high authorities that it is more common in middle life than in childhood and youth. The contrary statement has been made,⁴ but, as it would seem, on insuf-

¹ Prout. ² A designation which Dr. Rees and some others would abolish.

³ Druiitt. ⁴ Rilliet and Barthez.

ficient grounds. Rayer met with only two instances in infants out of a very large number. In those tuberculous in other organs, the kidneys are often thus degenerated. Extension of the disease from one urinary organ to another is manifestly the fact. The kidneys may become greatly enlarged, and their cavities enormously dilated; the glands may even be felt on palpation;¹ if this occur in a strumous person, the nature of the structural change can hardly be doubtful. The bladder, urethra, prostate gland, and even the vesiculæ seminales, may be affected with tuberculous disease, and, in the vast majority of cases, the action is doubtless progressive from one to the other. In the female, the uterus, Fallopian tubes, and not infrequently the lumbar and mesenteric glands, together with the intestinal mucous membrane, may become continuously tuberculous.

During life, it is very difficult confidently to assert the existence of tubercle in the kidneys. There may be albuminous urine and dull aching in the lumbar region, with occasional soreness to the touch—signs not sufficiently distinctive for a definite conclusion.

When the tuberculous matter softens, the microscope comes to our aid. Pus-corpuscles, blood, and an amorphous, granular matter, insoluble in acetic acid, are observed in the urine. If cystitis accompany, shreds of mucous membrane also appear. If the scrofulous diathesis be distinctly marked, and the above conditions exist, tubercular degeneration may be safely diagnosticated. Scrofulous disease of the vertebræ is often associated with the same affection in the kidneys.²

Mr. Ancell³ believes that, although the kidneys are not peculiarly liable to inflammatory disorganization as a primary affection, yet chronic nephritis, of a *suppurative* tendency, sometimes occurs, and in the adult, tubercular nephritis is often met with.

MM. Rilliet and Barthéz consider tubercular nephritis⁴ rare in tuberculous children; so that, if symptoms of renal inflammation occur in them, they are probably owing to some other cause, and diagnosis should not be too much influenced by the fact of their vicious constitution.

When the tuberculosis of the system is very extreme (as in one

¹ MM. Ammon and Pasquet.

² Rayer.

³ On Tuberculosis.

⁴ "Plusieurs des malades qui nous ont servi pour tracer l'histoire des néphrites étaient tuberculeux, mais chez un bien petit nombre, les produits accidentels étaient assez abondants pour pouvoir être regardés comme la cause de la maladie des reins." (Auct. cit. *Mal. des Enfants*, tome iii. p. 465.)

form described by Rokitansky), *all* the abdominal organs are pervaded, and in the resulting disturbance, renal symptoms would hardly be sufficiently prominent to arrest special attention. When a mass of tuberculous matter has formed in the kidney, and ulceration has occurred, the abscess has been termed *vomica renis tuberculosa*.¹ In such cases, diagnosis is somewhat assisted by the fact of purulent discharge, but may still be obscure, and at all events is rather late to give direction to remedial measures. The amount and severity of the symptoms depend mainly upon the quantity of the tuberculous deposit. If but small, and chiefly in the form of granulations, little constitutional disturbance exists; in fact, no indications of renal disorder may appear.

Rilliet and Barthez mention a tuberculous cyst of the kidney in a youth of 13 years, which occupied more than one-half of the gland. There were other small cysts, some containing fluid of a urinous odour, others a whitish matter, in which floated white floculi; others, still, were filled with softened tuberculous masses. The symptoms are not given. These authors found renal tubercles in 49 out of 312 children.² They refer to the possible manifestation of anasarca, and report two cases. Rayer, whose observations have been so extensive, does not allude to the latter symptom.

The diagnosis of any disease in children is often very embarrassing; renal disorders form no exception, unless in cases where microscopy is of avail, and when vesical calculus presents its peculiar indications. Acute nephritis is not described by Rilliet and Barthez, on account of the paucity of the cases they were able to collect.³ Rayer notes the presence of pus in the kidneys, in certain dissections of very young infants. From this fact, inflammatory action may be predicated, yet no symptoms had drawn attention to the urinary organs. He considers acute nephritis very rare in children.

Dr. West⁴ refers to the more common occurrence of "albuminous nephritis" in the child, especially as a sequel to the eruptive fevers, scarlatina taking the lead. This we allude to merely to signalize the frequency with which the latter affection enters the ranks of our diagnostic evidence; *ubi morbus, ibi effectus*. The symptoms

¹ Rokitansky.

² *Maladies des Enfants*, tome iii. p. 462.

³ *Ibid.*

⁴ *Diseases of Infancy and Childhood*.

vary greatly; from slight puffiness about the face to excessive anasarca and even abdominal dropsy. The constitutional sympathy is proportional; from a state of mere "poorliness" to excessive feverishness, anorexia, thirst, weakness and restlessness. The skin is dry, the urine scanty, the bowels costive. Coma may follow, and the case is then hopeless. The urine is deeper coloured than is natural, and acid to test paper. In severer cases it is of a deep brown or smoky hue, deposits a reddish-brown sediment, and is loaded with albumen. Under the microscope, it shows crystals of lithate of ammonia, blood-globules, mucus-corpuscles and epithelium scales. If cerebral symptoms supervene, it may be feared that urea is circulating in the blood.

Dr. West calls attention to the important fact that dropsy of an apparently inflammatory nature occasionally follows scarlatina, *but the urine is free from albumen*. This establishes the differential diagnosis. Dr. Philip (*Casper's Wochenschrift*, August, 1840) and Dr. Henry Kennedy, in his account of the epidemic scarlatina of 1834 and 1842, in Dublin, refer to this. A child may show a slight degree of anasarca after scarlatina from mere feebleness.

Calculous disorders are more frequent in children than in adults. Various and abundant deposits in the urine of the former are common. Lithate of ammonia or lithic acid are the most usual. During dentition, or when suffering from a "cold," the child may be observed to have scanty urine, and to suffer when passing the last few drops, crying and retracting the limbs towards the abdomen. The urine should be at once examined. Colic, in children of from three to four years of age, *may* arise from some urinary disorder; the lithic acid gravel being often abundantly deposited.¹

X. CANCER OF THE KIDNEY.

This is a very rare renal affection, especially when the degeneration does not exist in other organs. The kidney is often found to participate, when parts in its vicinity are cancerously diseased, and

¹ The above general remarks upon urinary diseases in children, although not particularly connected with the heading under which they are given, are not precisely out of place, since scrofulous kidney, as found in the young, was under consideration.

at times when more distant portions of the body are attacked. Propagation by contiguity is not uncommon, as from the liver to the right kidney; from stomachal or intestinal contact (those organs being diseased) with the left.

Encephaloid cancer is the most common form remarked. Dr. Walshe, out of forty cases of renal cancer, found thirty-one encephaloid. The hæmatoid variety of encephaloid is more common in the kidney than in other internal organs. Cancer is more likely to exist in both kidneys, simultaneously, than is tuberculous disease. The aged are the most exposed to its ravages, and males more than females.

At an early stage, diagnosis is difficult. Pain exists, it is true, and is usually deep-seated, but hardly characteristic. It is generally more constant than that occasioned by renal calculus, and from its frequently being felt in both kidney regions at the same time, becomes more distinctive.¹ Yet there is a difficulty in distinguishing between it and the suffering arising from certain affections of the spinal marrow, or the aorta, and from other morbid changes in the kidney itself. The sign, of itself, is insufficient.

At first, no enlargement of the substance of the gland by development of cancerous nodules, is declared on palpation; later, the irregular feel of the surface of the tumour is strongly diagnostic. Dyspepsia, of more or less aggravated nature, almost constantly exists; there are also anorexia, flatulence, and, occasionally, nausea and vomiting. These signs are, however, in themselves of but minor value, from the fact of their frequent manifestation in other morbid conditions of the kidney. If the skin, as the disease advances, assume the pale, sallow hue so characteristic of the cancerous cachexia; if there be œdema of the legs, and gradual loss of flesh and strength—hopeless cancerous degeneration is nearly certain.

Hæmaturia occurs, in variable degree, in renal cancer. If abundant, it may plug the ureters and coagulate in the bladder. Actual obstruction may thus happen, great mischief ensue, and a fatal termination of the case be much hastened. The pain and other distress will be greatly increased under such circumstances. The urine is sometimes albuminous, even when no blood is seen in it; in the last stages it is dark-coloured and often foetid, portions of the encephaloid

¹ Another distinctive mark between this affection and stone in the kidney is, that in cancerous disease there is no retraction of the testicles, or very rarely.

phaloid matter being found in it. There may be albuminous urine in these cases, without any of the latter signs.¹ The local manifestations assist diagnosis very little. A careful discrimination of the constitutional symptoms, with the history of the case, is, in the early stage at least, our chief reliance. The form of the discharged blood adds nothing to our knowledge. Casts of the uriniferous tubes, indicating the source of the sanguineous flow, were not, in these cases, discovered by the microscope in the hands of Johnson. When the characters of the encephaloid matter can be recognized in the urine, the nature of the disease is evident.

Differential Diagnosis.—Cancerous tumour of the kidney may be supposed, when the enlargement is of the *liver*. The renal swelling, however (if there be no anatomical displacement), is in the lumbar region. In front, the intestine will yield a tympanitic sound on percussion; in its rear, there is no hollow resonance between it and the spine. An enlarged kidney is not movable; were the tumour of *splenic* origin, it would extend higher up into the chest, and its anterior, notched edge is frequently distinguishable. Ovarian tumour would more likely be taken for renal, than would splenic; but it is lower in the abdomen and traceable to connection with the uterus, either externally or by vaginal examination.

A swelling in the renal region, increasing rapidly, having an uneven, nodulated surface, accompanied by hæmaturia and discharge of encephaloid matter, sallowness or leaden colour of the skin existing, cancer in other organs perhaps conjoined, sufficiently declares the disease. Tubercular enlargement and renal cysts from obstructed ureters, or other causes, present a more even surface, and in the latter case there may, perhaps, be a sense of fluctuation. Acephalocysts of the kidney are so rare, that cancerous disease is far more presumable. The only sure sign of the existence of hydatids is their escape with the urine.

When *echinococci* have been manifested either naturally or artificially in the human subject, and a tumour is discovered in the renal region, their presence in the kidney may be suspected. The diagnosis will be advanced, if the "hydatid-trembling" (Küchenmeister *et al.*) be perceived on percussion and palpation. Piorry first referred to this sensation (*frémissement*). The passage, from open cavities of the body, of the gelatinous vesicles described as

¹ Christison.

characteristic of the echinococcus, is, says Küchenmeister, the most certain evidence of the presence of a colony of the parasites in a patient. (Vide *Manual of Animal and Vegetable Parasites*.) This writer repudiates all internal treatment, and all measures with salves, ointments, etc. When the swellings are accessible, incision, puncture, or acupuncture with galvanism are advised. Iodine, iodide of potassium, alcohol and distilled water, together, were injected in an instance of echinococci of the lungs, by Vigla, with success. (*Op. sup. cit.*)

A distinctive mark of hydatids during life, when any manifestation of their presence occurs by the urine, is the issue of a greenish, purulent-looking fluid from the urethra. In a case reported at length in the *London Lancet* (September, 1853), "a milky, turbid, puriform fluid" was passed, at five separate acts of micturition; the *sixth* "brought away clear urine." Nearly "three half pints" were voided. There was no pain in the course of the ureters, bladder, or urethra, and "no difficulty in evacuating the masses" (*hydatid membranes*). Dr. Sieveking, who relates the case, thinks the hydatid mass had gradually become disintegrated, and that it was probably seated near the renal calyx, being dislodged by a violent wrench sustained while playing at skittles, and that the pain felt in the back and hypochondrium was caused by the bulk of the passing morbid product. The clear urine Dr. S. thinks came from the left kidney; the *right* was the one affected, and over it there had been a slight tenderness on pressure. Icteric symptoms accompanied. The very slight disturbance of the renal functions and the little constitutional sympathy are remarked.

The "greenish, purilaginous" contents of the hydatid cyst consist, in great measure at least, of "free oil." The likeness to pus is accounted for by the probable decomposition of the fluid in the hydatid cyst.

In the same journal for December, 1853, is an account of "Medullary Enlargement of the Kidney,"¹ a few particulars from which will contrast, diagnostically, with the above case. The patient was a stout, strong man, of very irregular habits. *Symptoms*.—When first seen, anasarca and ascites existed (the patient had applied very late for advice); he stated that his legs began first to swell, and that difficulty of breathing followed, with loss of strength. Just before

¹ Under the care of Dr. Wilson.—Report by Mr. Folker, H. S.

entering the hospital,¹ four attacks of hæmaturia; cough; dyspnœa; ascites; anasarca; blueness of the face and extremities; great anxiety of the countenance; complete anorexia; costiveness; sounds of the heart very tumultuous; pulse, weak and laboured; urine scanty, with *acid* reaction, specific gravity, 1.009; no albumen. The lungs, liver and kidneys contained encephaloid masses. The left kidney weighed 5 lbs. 4 oz.; the medullary mass into which it was transformed appeared to have grown from the upper part of the kidney and renal capsule; most of the lower cones, and the pelvis of the kidney being healthy. The left renal vein was much enlarged. The opposite kidney was healthy, weighing seven and a half ounces. (*Loc. cit.*)

In forming an opinion in suspected cancer of the kidney, we should be certain of the absence of tuberculous disease in the lungs; of calculous formations; of urethral stricture, which might produce, by dilatation, tumour of the ureter and kidney. The surface of the latter is lobed in these affections, but not irregularly nodulated, as it is in cancer. Cancer of the kidney may long exist unsuspected, when serious concomitant disease overshadows less marked trouble. Dissection often reveals such extensive morbid deposit, that we are at a loss to explain the absence of more definite symptoms during life. A specimen (No. 593) in the Cabinet of the "Boston Society for Medical Improvement" shows this to be true—it is a large carcinoma of the kidney, totally unsuspected during life. The patient, except for epileptic disease for 14 years, "had generally enjoyed good health." The left kidney was the one so thoroughly disorganized, the right was healthy. The latter fact may explain the perfect performance of the renal function. How far the coma which ensued, in the last and severe epileptic fit experienced by the patient six or eight weeks before death, may have been due to contamination of the blood resulting from renal disease, it is impossible to say. There were "some diseased masses in the brain, probably carcinomatous." (*Vide Catalogue.*) Specimen 594 of the same Cabinet, exhibits *both* kidneys carcinomatous; the patient was a *little girl*. The fact of both glands being attacked, and the youth of the patient, render this a remarkable case; and still more so from the statement that she "*never had any symptoms which were referred*

¹ North Staffordshire Infirmary.

to the kidneys." There was cancerous disease in the other abdominal organs, and it is not improbable that if any renal symptoms were, in the least degree, existent, they were masked by more apparent disorder. The insidious nature of the affection, at times, is obvious.

There are two great classes of influences from which, the physician gathers his information in these affections—the external and the internal. Age, condition, habits of life, hereditary predisposition¹ and diseases, accidents, antecedent ailments, are all powerful elements in forming a diagnosis. Conjointly with these, the inner manifestations, so influential upon the life, should be well weighed. Anxiety and mental depression, fatigue of mind, apprehension of disease, morbid watching of symptoms by the patient, may greatly influence the production of any renal disorganization. This is perhaps particularly true of the malignant forms of degeneration. If mental action be found so strongly causative of its manifestation in other parts, why not in those we have under consideration?

In *all* renal diseases, candor on the part of the patient greatly assists the medical adviser. The habits must be known; the indulgences, as well as the privations; what the diet habitually is; what medicaments have been taken. Proof enough has already been adduced of the value of chemical and microscopical examinations; they are often the "last," but certainly not the "least" of our diagnostic means; in many instances their earlier use would have proved of infinite advantage.

XI. HÆMATURIA.

Although generally only a symptom, hæmaturia occurs independently of renal disease. The alarm of the patient naturally consequent upon its appearance, and its own actual importance, make it imperative that the practitioner should at once detect its source and fix its value as a sign. In acute affections of the urinary organs, particularly when the blood is deteriorated, it is not uncommon. Its signification in acute desquamative nephritis has been considered. It is far more usual in this latter, as it is in all acute

¹ These might not be deemed, properly, external influences; but we intend to imply remoteness in their action.

renal disease, than in the chronic form. The moulding of the blood into "*tube-casts*" also indicates its origin. Cylindrical pieces of fibrin, evidently shaped by the ureter, and finally detached into the bladder, whence they pass *per urethram*, are characteristic of hæmorrhage from the kidney or from the very commencement of the ureter.¹ Before these come away, retention of urine, pain, and vomiting, may make the case assume the aspect of either malignant or calculous disease. Hæmaturia may be caused by the ingestion

Fig. 10.



Blood-cast—oxalate
of lime crystals.
After JOHNSON.)

of irritating material which finds its way into the blood. Oil of turpentine sometimes has this effect, when used medicinally; the same is true of cantharides. In cases thus arising, the microscope would undoubtedly detect the blood-casts of the renal tubes, showing the source of the hæmorrhage.² Frequent micturition, with scalding, and very thorough impregnation of the urine with blood, and often with albumen, are concomitant circumstances. Oxalate of lime (Fig. 10) crystals may sometimes be entangled in the "blood-casts" observed. The blood, in such cases, comes from the ruptured Malpighian capillaries, irritation being induced by the substances taken. Often, if the bleeding be rapid, a certain amount of unmoulded blood escapes, but the existence of any

tube-casts is sufficiently distinctive.

There are many other causes which may give rise to hæmaturia, independently of actual disease. We are sometimes unable to trace the material which has entered the circulation and produced the irritation and final rupture of the vessels. Dr. Johnson mentions a case, where a physician of thirty-seven years had hæmaturia, the urine smelling like "rotten parsnips." It was conjectured that the bleeding was caused by the irritation and elimination of the substance which gave this odour to the urine; and although the patient was hereditarily predisposed to renal disease, the fact of the blood being observed under the microscope to take the form of "*tube-casts*," together with the reflection that certain substances have the effect to cause bleeding, etc., induced Dr. J. to pronounce the hæmaturia independent. Neither heat nor nitric acid caused even opacity

¹ Watson.

² *i. e.* From a point above the pelvis of the kidney; thus distinctive from other bleeding.

of the urine. Oxalate of lime crystals were observed, but there was no reason to suppose the bleeding at all due to that deposit.

Hæmaturia may result from exposure to cold and wet, coupled with depression of spirits or anxiety and an impoverished state of the blood, without actual disease of the kidneys. If the blood be moulded in tubular form, it does not arise from calculus. If improvement take place under the use of iron and other tonics, therapeutics become diagnostic; if rest and good diet cause still further amendment, we are confident that the disorder has arisen from impoverishment of the blood and general debility. There may be renal hæmorrhage in certain cases of malignant fevers of low type. Scurvy and purpura occasion it, at times. This we might expect, from their nature. When the phenomenon occurs in typhoid fever, it is of the worst import. We had, not long since, a young and stalwart Irish labourer under our care, with typhoid fever, who exhibited this unpromising symptom. His case, hopeful until then, grew momentarily aggravated. Catheterism was required, and very large quantities of urine, almost black with effused blood, were drawn off. No *post-mortem* examination was allowed. The grave typhoidal condition sufficiently accounted for the bleeding.

Dr. Prout mentions cholera as one of the diseases in which hæmaturia is observed. Malarious influence is another cause. An epidemic character sometimes invests it. In chylous urine, hæmorrhoidal congestion, and suppression of the catamenia, hæmaturia may occur.¹ Impacted, or passing, renal calculi have already been

¹ Specimens of *chylous urine*, in climates like that of England and our own, are confessedly rare. Dr. Beale has a paper upon the subject, with cases and analyses of the urine, in the *Archives of Medicine*, No. 1, pp. 10-11, *et seq.* The entire account is well worth perusal; the writer's main conclusions are the following:—

“With regard to the *treatment* of cases of chylous urine, it has been stated that the use of astringents has afforded much benefit. Gallic acid has been productive of very great relief in several, and probably in one, of permanent cure, but it is not equally applicable to all cases.

“Upon reviewing the chief points in this and other cases, one is led to conclude that the condition does not depend upon any permanent *morbid* change in the secreting structure of the kidney, and that the chylous character of the urine is intimately connected with the absorption of chyle. The debility and emaciation show that the fatty matter, albumen, and other nutritive substances are diverted from their proper course, and removed in the urine, instead of being appropriated to the nutrition of the system. Whether these materials are separated from the blood by the kidneys, or find their way to these organs by some more direct course, cannot now be decided.”

* In recommending attention to the subject by practitioners in the West Indies,

referred to as causative; a case illustrating this has been given, and which fell under our observation, many points in diagnosis being obscure. In these instances, it should be remembered that there may be no bleeding until after the concretion has passed into the bladder, and left the wounded ureter free to discharge the effused blood.

Blows upon the loins sometimes cause hæmaturia. The character of the bleeding is various; it may be immediate. A remarkable case is related, in which no bloody urine was seen until three years after the injury (a blow over the left kidney);—there then was remission of the bleeding for seven months, after which the attacks were frequent. Walking, cold, and exposure, will, almost inevitably, induce recurrence. The patient just referred to was invariably attacked after putting his hands into cold water. If blood-casts of the tubes are observed, their signification is evident. A blow over the kidney would be weakening, and likely to induce a permanent irritability in the organ. Any over-taxation of the gland, under these conditions, would show itself by hæmorrhage. Hitherto, microscopic research has been but slight in these cases; but it is most probable that the effused blood would always be moulded in the form of tubular casts.

The presence of the *Distoma hæmatobium* in the urinary passages, or in the kidneys or bladder, may give rise to attacks of hæmaturia, which do not admit of an explanation otherwise. Küchenmeister speaks of those "causeless hæmaturias," which are suspicious in this way, especially in consumptive persons. He also suggests that the essential hæmaturia of the tropics may be due to the same cause. "The diagnosis can only be made perfectly certain during life, when eggs are found in the bloody urine, and in other evacuations, as was done by Bilharz." (*Animal and Vegetable Parasites*.) The same author believes that the diagnosis of these cases is still further elucidated by the attacks of pyelitis, by vesical disorders, and the manifest exacerbations observed in any existing

Dr. Beale says, "in *post-mortem* examinations, the serum of the blood should be collected and allowed to stand, in order to see if it were milky or not. The state of the mesenteric glands, lacteals, and receptaculum chyli, should be particularly examined, and it would be desirable to inject the thoracic duct, first with transparent fluid injection, and afterwards with a little strong size, when the course of the absorbent trunks might be traced, and, if necessary, parts subjected to microscopical examination."

disease of the urinary organs; also by the occurrence of "an indefinite illness, with occasional disturbances in the urinary secretion, and, in severe cases, perhaps even enlargement of the kidneys." A catarrh of the pelvis of the kidney may be induced by the *distoma*, causing "blackish-red hyperæmia of the renal substance, without any other change." (*Op. cit.*) Griesinger reports the abundance of this worm in Egypt. In 363 dissections, it was noted 117 times; and the possibility of overlooking its lower stages is mentioned. The unfiltered water of the Nile, the cereal products of the country, and the dates are accused of introducing the entozoa into the body; but especially is the ingestion of "half-putrid" fish believed instrumental. Griesinger suggests calomel and turpentine as the best remedies. Küchenmeister mentions onions, garlic, &c., together with "strict hygienic regulations." (*Vide* Küchenmeister, *op. cit.*)

Differential Diagnosis.—Vesical hæmorrhage may be distinguished from renal bleeding by the absence of tubular blood-casts, and generally by the lack of symptoms referrible to the kidneys. Ammoniacal, strongly irritant urine, with phosphatic sediment, mingled with thick, stringy mucus;¹ the constitution being debilitated, but the strength returning gradually, under tonic treatment, are circumstances indicative of the *vesical* origin of the hæmorrhage. In simple, or in cancerous ulceration of the bladder, or in fungoid disease of the prostate gland, blood often appears in the urine; in stricture of the urethra, with retained urine, the bladder may become inflamed, and hæmaturia, in variable degree, occur. Stone in the bladder is another cause. The symptoms declaratory of its existence are usually very decided.

General Considerations.—The causes, when possible to be known, the locality from which the bleeding comes, therapeutical results, and microscopic revelations, are all reliable elements of diagnosis.

¹ What has long been spoken of as "ropy mucus," in certain cases of vesical disease, is, according to Dr. Todd, *pus*, altered by the presence of an alkaline ingredient in the urine. Dr. T. remarks: "It may be laid down as a general rule" that, in the form of cystic hæmaturia dependent on retention of urine in the bladder, and the generation of carbonate of ammonia, "the urine contains more or less of muco-purulent matter." * * The liquid pus is acted on by the alkali, and is rendered viscid and stringy. "The reaction," says the lecturer, "is probably due to the presence of oily matter in the pus, which, uniting with the alkali, forms a soap." (*Clinical Lectures on Certain Diseases of the Urinary Organs*, by Robert Bentley Todd, M. D., F. R. S., etc., 1857.)

The *form* of the blood often reveals its source; its *mode of issue* is important; if it come away *guttatim*, without the urine, it is almost sure to spring from some point of the *urethral* surface. If, however, the injured part be near the bladder, blood might enter that organ by reflux, and subsequently passing with the urine, somewhat confuse diagnosis. Soreness of the urethra might exist, and prove a guide.¹

When fungoid disease is the cause of the hæmorrhage, the blood-globules, even to the unaided eye, appear larger than is natural; they may be distinctly seen, rolling along the bottom of the vessel, and resemble grains of lithic acid gravel.² If suspicion of malignant affection be confirmed, the source of the hæmorrhage is plain. If a coagulum be retained in the bladder, it may become the nucleus for a future calculus. Previous hæmaturia, in a patient suspected of stone, would, in this point of view, be confirmatory. An instance is related of the persistence of hæmaturia for two years; the patient was a resident in a very malarious district; there was excessive anæmia.³ *Post-mortem*, a mulberry calculus was found in one of the kidneys, and which was probably the immediate cause of a portion of the hæmorrhage; a spot "about the size of a crown-piece," at the upper and posterior part of the bladder, seemed to have furnished the greatest amount. The bleeding was probably by "transudation through the mucous membrane, from a large plexus of veins distended with dark-coloured blood, and situated immediately behind this part of the bladder."

Blood found in urine, having a greenish, citron hue, without lithic acid—the patient being unaccustomed to see urinary sediment, and having the cachectic appearance observed in the oxalic-acid diathesis—most probably arises from irritation by mulberry calculus. Phosphatic concretions rarely cause hæmaturia of any consequence.

Renal hæmorrhage is usually small in quantity, and the blood is equally diffused through the urine, except for the shreds or cylindrical filaments observed. On boiling the urine, the contained blood coagulates, and leaves the fluid of its natural colour.⁴ Prostatic bleeding may be caused by instruments used for exploring the

¹ "If blood or pus be discharged without any evacuation of urine, it is from the member itself" (*i. e.*, the penis).—Paulus Ægineta, vol. i. p. 544.

² Prout.

³ Ibid.

⁴ Druitt.

urethra and bladder; after examination of the latter, and when the urine has all been voided, pure blood may follow. Vesical is more profuse than renal bleeding; the clots are also of larger size; renal and lumbar pain are absent, and most of the uneasy sensations are referred to the neck of the bladder, or to the pubic region.

CHAPTER IV.

DISEASES OF THE URETERS.

THE morbid affections of the ureters are comparatively few. So far as we are aware, none can be termed idiopathic. Inflammation extends into these canals, forwards from the kidneys, backwards from the bladder; it may be excited in some portion by obstruction and irritation from calculus, or other cause, as coagula, &c. Abscess in their vicinity may affect, and even open into, them; this is particularly true of psoas abscess. Cancerous disease is rare in the ureters.¹

Usually, when involved in renal or vesical diseases, the symptoms referrible to the latter wholly mask any indications from these canals; this is especially true of communicated inflammation.

Renal concretions, on their passage from the kidney downwards, occasion the most decided manifestations ever declared by the ureters. The intensity of these phenomena is proportioned to the size and shape of the stone. The diagnostic signs of this process have been already detailed. We pass to a few other considerations relating to diseased action in these organs.

Obstruction of a ureter, from whatever cause, presents us with variable symptoms. Pain and disagreeable sensations may exist for a time, and gradual, often final, subsidence follow. Dissections frequently show entire atrophy of the kidney, obstruction of its ureter by a calculus, and hypertrophy of the opposite kidney to a very great degree, sometimes to double its usual size. The enlarged gland, in these cases, has been doing the duty of its fellow, in addition to its own, for years. If one canal be obstructed, and the opposite organs remain healthy, the patient, if of good habits, has a fair chance of escaping, indefinitely, from anything additional to the trouble arising from the closed ureter; and the disturbance is,

¹ They are apt to be affected by contiguity to a cancerous bladder.

in many cases, exceedingly slight. Frequently, however, excruciating pain and consequent great constitutional sympathy, with high fever and very marked prostration, may induce a condition from which the patient never rallies. Moreover, by reason of sufficient urine not being secreted (the sound kidney only gradually accommodating itself to its double task), urea may be thrown into the circulation, and coma finally supervene.¹

The ureter generally becomes greatly enlarged above an obstruction; sometimes it attains the size of the little finger; instances have been known of its reaching the calibre of intestine.² The pelvis of the kidney, and the whole gland, subsequently, dilates into a pouch or cyst, filled with urine, or a mixture of serum and urine; pus is occasionally formed.³ The cyst is sometimes perceptible on palpation, in thin persons. Diagnosis is not usually difficult, particularly if there have been even slight symptoms of obstruction. In favourable cases all remains quiet, and the kidney atrophies, from disuse. If suppuration occur, and progress, either in the kidney or ureter, its existence would soon be declared. Paul of Ægina⁴ refers to these conditions in the following language: "When the kidneys are ulcerated, the patient experiences a heavy pain in the loins, he makes water freely, and pus is found mixed with the urine, and particles of flesh floating in it. * * When the *ureters* are ulcerated, the mixture of the pus is in an intermediate degree, and rather resembles hairs floating in the urine; and the situation of the pain is intermediate between the kidneys and bladder." We may admire the accuracy of this description.

The following causes of obstruction of the ureters are enumerated by Dalmas (*Dictionnaire de Médecine*); and dilatation of more or less serious extent occurs:—Spontaneous obliteration of the canal; its compression by a tumour; its closure by any substance too large or thick to pass, or by calculi; cellulo-vascular bands developed in the abdominal cavity; adhesions; retention of urine by reason of urethral disease. Diagnostically, the signs will be nearly the same, but a knowledge of the *cause* is highly important. In cases of compression of the ureters, or of one of them, by abdominal tumour or adhesions, there would be a certain obscurity. The instances must

¹ See Appendix, Note F.

² Specimen 599, Boston Society Medical Improvement Cabinet, illustrates this; the ureter was mistaken for intestine.

³ Rayet; Johnson; Brodie.

⁴ Vol. i. p. 544, Syd. Soc. Ed.

be rare. Spontaneous obliteration is yet more infrequent: nothing would specially indicate it. The absence of the usual symptoms of stone lodged in the ureter would allow an inference in favour of spontaneous closure.

There may be great *thickening* of the walls of the ureters, and, on the other hand, their *perforation* sometimes happens. The latter is uncommon; when it occurs, the portion forming the pouch near the pelvis of the kidney is the usual seat. Symptoms of peritonitis follow very rapidly, unless the rupture (by adhesion, or closest contiguity, with ulceration) take place into a portion of neighbouring intestine. The latter, as well as the former accident, is almost uniformly fatal. Inflammatory symptoms, succeeded by a typhoidal state, or by entire collapse, are generally observed.

Nature often exhibits a wonderful power of resistance in these formidable cases. Necroscopic examinations reveal many astounding appearances. A cyst has been found closed around a calculus; the substance of the kidney gone; the individual, doubtless for a long time, had lived with only one kidney.

Civiale, alluding to the equal, and often unequal dilatation of the ureter, owing to obstruction, remarks that the process is purely mechanical, and makes no allusion to any subsequent results in the ureters themselves. Most of the symptoms are referrible to the kidney connected with the blocked ureter; except calculus coexist, when *its* distinctive signs appear.

The affections of the ureter are chiefly important on account of their action on the kidneys, by causing either destructive disease in the one, or over-working the other; thus inducing more general disorder. Much importance consequently attaches to them; life is often rapidly compromised; at all events, the foundation of extensive mischief is laid. Pain, and occasionally swelling, in the region of the ureters, are the most direct intimations we possess in these cases. Relative information and the history of the patient are the main reliance.

CHAPTER V.

DISEASES OF THE BLADDER.

GENERAL REMARKS.—These diseases are of two classes; first, those connected with inflammation of the bladder and its appendages, or of some organ contiguous; and secondly, those arising from mechanical and structural disorder of the bladder, kidneys or immediately related parts. Under this head should be ranged those affections chiefly manifested by mere functional disturbance, and aptly termed "*irritable*." So intimately are these two divisions blended, that it is not easy to draw the line of distinction between them. Functional disturbance will be only cursorily considered here, while organic and mechanical disease will receive the most attention. The diagnosis of vesical calculus is properly referred to the class of mechanical affections. Both the physician and the surgeon are here concerned; the latter chiefly. Wounds of the bladder, from external violence, are generally easily recognized, either from the cause producing them, or by palpable results. The same is true, in great measure, of mechanical injuries from the imprudent or necessary use of instruments.

CYSTITIS.

IRRITABILITY OF THE BLADDER.¹

Spasm of the Bladder. Paralysis of the Bladder.

HYSTERICAL AFFECTIONS OF THE BLADDER.

TUMOURS AND THICKENING OF THE VESICAL WALLS.

WOUNDS OF THE BLADDER.

RUPTURE OF THE BLADDER.

VESICAL FISTULA.

VARIX OF THE BLADDER.

DISEASES BY DISPLACEMENT: (Varieties of Cystocele.)

VESICAL ABSCESS.

SUPPRESSION, RETENTION, AND INCONTINENCE OF URINE.

VESICAL CALCULUS.

¹ No separate heading has been made for Vesical Cancer, which is treated of under the Section devoted to Vesical Irritability.

I. CYSTITIS. (*Acute.—Chronic.*)

Inflammation of the bladder is acute or chronic, partial or entire. It may be confined to the vesical neck. To define its actual extent in the living subject, in any given case, would be difficult. The locality of the pain and the apparent surface over which it extends are the only means of determining, if we except spasm of the vesical neck. Most authors consider the *acute* form first (as in other diseases), but Dr. Prout commences with the chronic variety, both from the fact of the comparative rarity of the former, and because it is usually preceded by the latter.

Cystirrhœa.—Cystirrhœa, or catarrh of the bladder, is more frequently induced than idiopathic; when of the latter character, it is usually sudden in its access. Stomachal oppression; burning heat and pain;¹ spasm in the vesical region, and often diarrhœa, accompany or follow each other in quick succession. The concomitance of hæmorrhoids is often remarked. There is a strong and constant desire to urinate, with spasmodic action of the bladder and urethra. A tenacious mucus is passed. Hiccough and vomiting sometimes occur, especially when the inflammation extends to the kidneys and ureters. Feverishness, thirst, weakness of the whole frame, but particularly of the back and loins, attend the previous manifestations. When the case is obstinate, loss of sleep, of strength and flesh, exists to an alarming degree. The discharge of mucus increases in quantity and tenacity; many pints may be passed daily; it is very firm, and sometimes adheres so strongly to the vessel, that inversion of the latter will not cause it to fall out. It is of an opaline hue, sometimes opaque; it may be streaked with blood, or contain pus; the latter being a highly probable alteration of its nature. If the disease be slight, the urine is turbid, whitish, acid; after standing, the mucous cloud falls, and leaves the liquid transparent. Disintegrated epithelium is sometimes observed. As the affection advances, rigors, heat, and perspiration alternate. Fever of a hectic type is now declared. There is more constant and sharper pain in the vesical region; pressure and the movements of the patient increase this; it often extends down the thighs, and

¹ Civiale remarks the peculiar pain ascribable to mucous plugs remaining in the ureter, or neck of the bladder; it is a feeling of weight and fatigue, rather than pain, and is accompanied by a burning sensation.

shoots into the rectum. The desire to urinate becomes more urgent, and the patient deteriorates in every respect; strength, colour, appetite, and power of exertion rapidly fail; the pulse is weak, very quick, and entire exhaustion soon closes the scene—unless, indeed, renal disease, induced by the vesical disorder, terminates life even earlier.

By reason of the mucous membrane being deeply injured, often ulcerated, in this second stage, we derive much information from the urine. It contains true pus, is often of a greenish colour, and there is less tenacity of the mucus; still later, a sort of putrilage is observed; the secretion is “serous and alkalescent;” when in this state, a strong ammoniacal fume arises from it—it will effervesce with an acid, and, on chemical analysis, the carbonates of soda and potash are generally found in it. The latter result from the serum of the blood, exuded from the ulcerated mucous membrane.¹ At last the urine becomes scanty, high-coloured, and may return to an acid reaction; the mucus and pus often nearly, or totally, disappear.² Death is then imminent. The sudden change of alkaline to acid urine, in protracted vesical disease, is considered a fatal symptom.³

Acute Cystitis.—The second stage of cystitis, just described, corresponds closely to what is generally termed *Acute Cystitis*. Mr. Coulson differs from Dr. Prout in describing a form of the affection which he calls *Acute Inflammation of the Mucous Membrane of the Bladder*. Dr. P. does not recognize this as idiopathic; the latter stages of the form above considered he regards as the nearest approach to it.

Scrofulous or malignant disease of the kidney may cause disordered action, and, finally, ulceration of the bladder; the phenomena would be similar to those already detailed. The *muscular* coat has been spoken of as *alone* inflamed. Diagnosis carried to so minute a degree, must offer unusual difficulties. Whatever the coat, or part of the organ concerned, it is probable the indications are very similar. M. Ferrus⁴ remarks, very sensibly, that such attempts at minute distinctions are, in *acute* inflammation of the organ, useless or impossible; in chronic cystitis we may seek to establish

¹ Prout.

² Chopart and Civiale both remark the diminution of mucus, as cystirrhœa grows worse.

³ Prout.

⁴ Dictionnaire de Médecine.

them with more reason.¹ Dr. Prout doubts the limitation of inflammation to the muscular coat. It is not easy to imagine any distinctive sign of such action therein, unless it be *spasm* of the organ; the character of any pain experienced might be instructive; a quality of dulness or weight would, perhaps, describe it. That inflammatory action could long exist in one tunic, without being propagated to the others, seems absurd. Pinel, Richerand, and others deny its possibility.

Rheumatic and Gouty Cystitis.—Rheumatic and gouty inflammation of the bladder occur in tropical climates, particularly in malarious districts. When inflammation of the bladder is general, and affects all the tissues, *rigor* is the first symptom; it may be very slight, sometimes escaping notice; it is most severe when the vesical neck and the prostate gland are involved. Anorexia, nausea, and uneasiness follow; the skin is dry and hot, with partial perspirations; the pulse, at times, intermittent—always frequent. Pain, more or less severe, is increased on pressure, and notably referred to the *rectum*. The *facies* of the patient is peculiarly anxious; the rigors become more marked and prolonged, and the other symptoms increase in violence. Hiccough comes on; finally, the abdomen is tympanitic; the urine is retained, and excruciating agony is experienced on using the catheter, whenever the *neck* of the bladder is affected. Tenesmus is a marked symptom, when the *fundus* of the organ is inflamed.

From the first, the patient usually rejects all food; at times even liquids are repelled. The diagnosis of these cases is very clear, long previously to the supervention of delirium, coma, or convulsions, which constitute a not infrequent termination. "The urine may deposit, copiously, imperfectly developed lithate of ammonia." (Prout.)

We are essentially aided in our estimate of the nature of inflammatory attacks of the bladder, by an early investigation of the patient's history and of the causes which have been acting upon him externally or internally. Surgical operations, wounds, and such causes readily point out their subsequent effects. Dr. Prout observes that inflammatory symptoms, referrible to the bladder, often arise after a slight operation about the rectum, particularly in the

¹ Grisolle enumerates, besides the divisions we give, *superficial* cystitis, or that limited to the mucous coat, and "*profonde*," or phlegmonous.

diabetic. "These persons," he adds, "are notoriously subject to what is termed diffuse inflammation of the cellular tissue, a form of disease nearly allied to, if not identical with the above." Many writers refer to the appearance of symptoms of cystitis after an operation for removal of hæmorrhoids. We had a case of this description, in which ligatures were employed for destroying the hæmorrhoidal tumours; slight symptoms of vesical inflammation ensued, with a degree of mucosity of the urine; the use of the catheter was required for some days; the patient was a female, between 50 and 60 years of age. Perhaps the signs mentioned might be considered as due to simple irritation of the organ, by sympathy. The discomfort was, for a time, serious; the recovery complete.

Cystitis after Lithotomy.—Cystitis which follows lithotomy has been ably described by many writers; among others, Sir Benjamin Brodie is conspicuous.¹ Diagnosis can hardly be difficult; the cause is evident, so are the symptoms; the latter are essentially the same as already detailed.

In pronouncing upon probable inflammation of the bladder, we may consider the existence of a scrofulous taint; venereal excesses; previous, or present, gonorrhœa,² especially if the discharge have been suddenly checked;³ hereditary gout and rheumatism; exposure to cold—and particularly to cold or moisture applied to the neighbourhood of the bladder—as by sitting on a damp seat; acrid diuretics; intestinal worms; violent horseback exercise; long retention of the urine, as all conducive to this affection.

Such symptoms as have been related, following these causes, point with great distinctness to their seat and nature. Chopart intimates that catarrhal inflammation of the bladder may sometimes be critical of another disease. Ferrus remarks that in moist climates, where the soil is wet, catarrh of the bladder is very common. Disease of the prostate gland and vesical calculus may excite this affection. Our means of diagnosis in regard to the prostate being the exciting cause are to be found in examination by the finger in the rectum, and by the passing of the sound; enlargement and tenderness of the gland may be perceived. These are the surest methods. There is every reason to presume the prostate to be enlarged and irritable, when the patient (particularly if an old man) has frequent strong desire to pass water, and if there be inconti-

¹ Lectures on the Urinary Organs, &c.

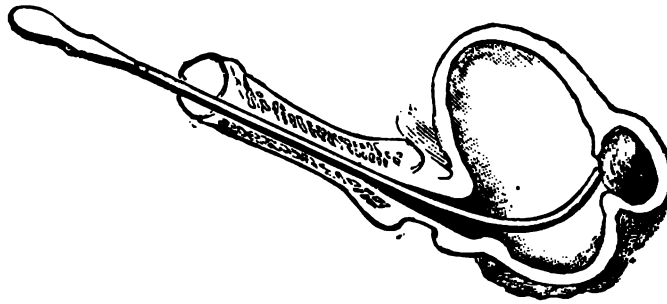
² See Appendix, Note G.

³ If rigors occur at such a time, abscess may be forming.

nence thereof at night; distension of the bladder is shown by the latter occurrence. When phosphatic concretions are voided by such a patient, and there is rigor, with throbbing pain about the perinæum, increased by long sitting, or during defæcation, undoubtedly acute prostatic inflammation exists; its rapid propagation to the bladder is extremely likely, and, unless the disease can be checked, suppuration and a fatal result will follow. Phosphatic concretions, collected in the pouches formed in the bladder by the forcing of its mucous membrane between the intervals of the muscular fibres, increase the difficulty.

Vesical calculi should always be sought for, if in the least suspected. These, with obstructions about the vesical neck, or in the

Fig. 11.



Sacculated calculus touched by the sound.

urethra, the surgeon should hold in special remembrance. Symptoms alone are not a sufficient guide. The *sound* must be used, and by a careful hand. Occasionally, even this means fails us, notwith-

Fig. 12.



Calculi eluding the sound. (See page 89.)

standing the calculus is really the cause of the symptoms. It may be sacculated, encysted, lodged in a fold of the bladder, or lying behind an enlarged prostate, and may thus escape even the *tactus eruditus*.¹ *Post-mortem* examinations have proved this. Such cases, happily, are exceptional. The most entire relief usually follows the removal of these mechanical causes.²

Enlargement of the prostate gland may originate that condition of the bladder termed *sacculated*. Inflammation is not infrequent in these cases. A remarkable pathological specimen illustrative of this, lately fell under our observation; it was taken from a gentleman of 75, a student, and yet of comparatively active habits. Ten years since, there was retention of urine, after exposure to bad weather; three other attacks since the first. Costiveness was habitual. There was pain, referred to the region of the neck of the bladder, and micturition often caused distress; the first use of the catheter occasioned great suffering; subsequently, this process was less troublesome than natural urination; the water, latterly, scalded the urethra intensely. Pus was finally evacuated from the urethra; there was no tenderness of the perinæum; the patient could sit with ease; indeed, his chief discomfort arose from *herpes zoster*, which was concomitant.³ *Post-mortem*, inflammation of the cellular membrane between the bladder and rectum, and *abscess* there, were discovered; the pus might have issued from the openings of the vesiculæ seminales, near the veru montanum, and thus easily passed *per urethram*. The two lateral lobes of the prostate were very much hypertrophied, the third lobe,⁴ or isthmus, somewhat so, forming an elevation, behind which (as the dissector remarked) a calculus might have lain and remained undetected—the sound gliding over it; urine might also collect there, and not be wholly voided. The bladder was enlarged, thickened, very much sacculated, and had doubtless been more or less inflamed. The case is instructive upon many evident points.

One of the two forms of Guthrie's "bar," probably constitutes

¹ See Figs. 11, 12, illustrating the circumstances sometimes baffling diagnosis by the sound, and also the position of a sacculated calculus.

² For remedial methods, see Part II., Chapter V.

³ The patient had an appetite, and "ate well."

⁴ Mr. Thompson, in his late work on the Prostate, says that there is no part of the healthy prostate entitled to this appellation; "median, or posterior median portion," is his term. (*Op. cit.*, pp. 4, 5.)

the sort of obstruction above referred to, in nearly all such instances. What is termed "the bar" at the neck of the bladder, appears to be differently interpreted by observers. Some part of the prostate may alone form it, but there may be an obstruction thus designated, when prostatic disease does not exist. Mr. Guthrie laid down the following propositions: "1. That an elastic structure exists at the neck of the bladder, and may be diseased, without any necessary connection with the prostate gland." "2. That the prostate may be diseased, without any necessary connection with the elastic structure." Those muscular bands known as "the muscles of the ureters," may become so hypertrophied, as to form an eminence seated "just *behind* an enlarged middle lobe of the prostate." "This," says Mr. Henry Thompson (*On the Enlarged Prostate*, London, 1858), to whom we refer for the above remarks, "is clearly not what was intended by Mr. Guthrie" as the "bar," nor can such an eminence be seated at the neck of the bladder at all, since it must necessarily "lie considerably posterior to it." (*Op. cit.*, pp. 240, 241.) Mr. Thompson points out that Dr. Gross does not mean the same thing by his "bar-like ridge" at the vesical neck, as Mr. Guthrie does. The latter intended to describe "an obstruction situated at the neck of the bladder, across the urethro-vesical meatus, and only when enlargement of the median portion of the prostate (middle lobe) is not present." Mr. Guthrie's second form of "bar" is recognized by all authors, and consists in "a drawing up of the mucous membrane and sub-mucous tissues, by the upward development of the adjacent lateral lobes of the prostate." (Thompson, p. 244.) When neither of the two above named changes produce an obstruction at the vesical neck, and when the latter is not caused by some abnormal development of the fibrous tissues there, which is a rare thing, it is believed to be ascribable to a hypertrophy of the muscular bands which associate the ureters with the urethra, and constitute the uvula vesicæ. It is not necessary to accuse the "bar" of having caused urinary symptoms. "Its existence simply proves that there has long been an undue amount of expulsive effort on the part of the bladder. It is itself but the result of that activity expressed in the form of hypertrophy; and the cause of the undue action which produced the bar has still to be sought." (Thompson, p. 248.) For operative measures in these cases the same work, amongst others, may be most advantageously consulted. Besides excellent descriptions, it contains superior illustrations.

Cystitis from Uterine Proximity.—The close vicinity of the uterus in females occasionally entails inflammation upon the bladder. Generally, the uterine symptoms prevail; the vesical, while of the same general character, may vary almost infinitely in degree. Grisolle¹ very properly calls attention to the possible closure of the vesical extremity of one, or even both of the ureters, by swelling of the tissues, when the *fundus* of the bladder is inflamed. The consequences of this formidable accident are sufficiently evident; accumulation of urine in the ureters and kidneys; final cessation of its secretion, and the sequelæ thereof; redoubled febrile action, delirium, extreme prostration, urinous odour pervading the excretions, &c.;—"fièvre urinaire."

In a woman 49 years old, we lately witnessed an attack which certainly must be termed *acute cystitis*, non-dependent upon chronic affection or mechanical cause. Her *menstrua* have been latterly slightly irregular; she once passed over a period. Aside, however, from any such connection, exposure to cold and wet induced the following symptoms:—Great restlessness, feverishness, anxiety of mind and countenance; severe pain (described as "agony" by the patient) referred to the navel and hypogastric region, more to the right side than to the left or middle; scalding sensation on passage of urine; rectal tenesmus; slight mucous strings floating in the urine, which was at one time turbid, at another clear. Fomentations, flaxseed tea, leeches to the hypogastrium were directed. Relief of pain was complete after leeching. Well in one week.

Cystitis from Vascular Urethral Growth.—Mr. Coulson² relates a case of cystirrhœa produced by a *vascular growth* at the external orifice of the urethra. Dr. Golding Bird had first seen the patient, a lady 40 years of age, who suffered from urgent desire to urinate and burning pain at the urethral orifice for two years; the urine escaping, by drops, almost constantly. She was obliged to rise every half hour through the night, and the strong ammoniacal odour exhaled from her person compelled her to quit all society. The urine was of a dark-brown colour, and very ammoniacal, containing a large quantity of viscid mucus; there was deposition of friable phosphates. All the symptoms of vesical calculus ensued; the vulva was inflamed by the continual dribbling of urine; there was intense suffering; walking was very painful and sexual inter-

¹ Pathologie Interne, vol. i. p. 467.

² Lancet, October, 1853.

course produced great agony. The urethra was surrounded, at the meatus, by extremely sensitive vascular growths. Dr. Bird believed these the cause of all the symptoms, and Mr. Coulson found no stone on examination. Partial removal, by *potassa fusa*, nearly produced a cure; when the whole was cut away by scissors (slight recurrence having taken place), recovery was entire; the urine became acid, and every symptom disappeared. The general health was wholly restored. The reporter remarks that obstruction to the complete evacuation of the bladder, by such growths, is the *rationale* of the production of cystirrhœa and inflammation; some ounces of urine are always retained, which, becoming ammoniacal and foetid, irritates the mucous membrane, and an excessive secretion of ropy mucus and calculous symptoms are induced.

Cantharidal Cystitis.—A child had been blistered on the arm and irritant dressing applied (on account of some affection of the eyes); symptoms simulating those of vesical calculus came on; difficulty in urinating, with violent pain in the act; cold sweat on the face; mortal pallor; extreme anxiety of countenance and gesture; emission of urine by jets; prickling at the end of the glans penis; pinching and pulling at the latter, &c. &c. False membranes were seen in the urine; no stone was found. Either the practitioner in attendance was unaware of the application of the cantharidal blistering tissue, and the continued epispastic dressing, or very strangely forgetful; probably the former was the case. A good example of *cystitis from cantharides*.¹

An instance of cystitis in an infant of *eleven months*, only, was reported by M. Reiseberg, in a Prussian Journal (*Preuss Zeitung*, No. 10, 1840). The symptoms followed an attack of convulsions. It is remarked how infrequent cystitis (acute) is, even in the adult; it is of course much more so in young children. Certain authors even deny its existence in them.

The *Archives Générales de Médecine*, August, 1846, quoting M. Reiseberg's case, inclines to question his diagnosis. A blister which was used, may, it is suggested, have had some influence; or some lesion of the nervous system may have induced retention of urine.

Cystitis from Tubercular Deposit.—This must nearly always be of the subacute form. "Chronic tubercular cystitis" is spoken of by authors. The symptoms correspond to the form. Tubercle is very

¹ Gazette des Hôpitaux, October, 1854.

rarely deposited in the vesical mucous membrane;¹ Louis saw it only twice in 200 examinations. Generally, it is found at the cervix and fundus vesicæ. Lombard found tubercle in the bladder once in 100 phthisical adults, and the same in phthisical young persons.²

II. AFFECTIONS INDUCING IRRITABLE BLADDER.

There are two classes of causes which originate irritable bladder—*functional disturbance* and *organic disease*. The functional disorders may arise from remote causes—sometimes termed “nervous;” often actually so, in the strict sense of the word. These causes are at times exceedingly difficult of recognition; the importance of their detection can hardly be over-estimated. Functional disturbance of the kidney may induce vesical disorder of this nature; the same is true of the bladder itself, and of the prostate gland. Degeneration, malignant disease, &c., of any urinary organ, constitute the second class of causes.

Druitt remarks that many cases of irritable bladder are but so many of chronic inflammation. When the renal function is disturbed, the altered urine, acting upon the mucous surface of the bladder, causes irritability. If too dilute, or too concentrated; over-acid, or alkaline in excess; or containing anything unnatural, the bladder will “*feel*” it; when the urine is healthy, there is no such manifestation. The dyspeptic, and those imprudent in diet are peculiarly liable. Urgent and frequent calls to urinate first attract attention—except by hysteric patients, only a small quantity of urine is voided at each attempt; an uneasy, burning sensation immediately follows the act, and this scalding is referred chiefly to the neck of the bladder, although frequently felt along the entire urethra. The urine is usually *acid*, and of a light greenish colour; it contains a certain amount of mucus and diseased epithelium; is of low specific gravity; often serous, rarely bloody. On applying heat, the phosphates fall; occasionally, lithate of ammonia is sufficiently abundant to separate spontaneously on the cooling of the urine; this is not common; the deposit is known by its ashy hue.

Among *special* causes inducing irritability of the bladder, are

¹ Rokitansky believes it generally to be extended from the genital to the urinary organs.

² Ancell.

³ Prout.

pressure of the gravid uterus; hardened fæces; hæmorrhoids; foreign bodies in the bladder; stricture; lithotomy; derangement of the digestive organs, by its action on the kidney; eating of acescent fruit—particularly in children.¹

Calculus is provocative of vesical irritability, and more often in females than in males; although the affection itself is most usually observed in the latter, if we exclude hysterical cases. The introduction of foreign bodies into the urethra, from prurient prompting, or otherwise, is doubtless a frequent source of this affection; such exceptional nuclei, of themselves, often set up an irritation; in time, calculous concretion around them is sure to awaken it.

Many singular instances of this sort are on record. Mr. Ferguson, while referring to the introduction of hair-pins into the bladder, in a female, also mentions, that in a man troubled with irritability of the bladder for ten years, he found a stone, and a bit of *sealing-wax* formed its nucleus!

A very remarkable case, illustrative of the hair-pin propensity,

Fig. 13.



Calculus formed upon a hair-pin. (See text.)

is reported in the *Extracts from the Records of the Boston Society for Medical Improvement* (October,² 1852), by Wm. G. Wheeler, M. D., of Chelsea, Mass.; the stone, extracted entire, exhibits the

¹ Coulson, Diseases of the Bladder and Prostate Gland. London.

² See American Journal of the Medical Sciences for April, 1853, pp. 361, 2, 3.

bent pin through its centre; the patient confessed that she introduced it into the urethra six years previously to the operation for extraction of the calculus. "The foreign body caused some pain and uneasiness soon after its passage within the bladder, but no severe symptoms were manifested until about two years after its introduction, since which time they gradually increased in severity." Irritation, pain in the pubic region, &c., with decline of the general health, were induced.

The taking of *alkaline remedies* in too large doses, or too frequently, is esteemed one of the causes of vesical irritation.¹ Gout and rheumatism are likewise accused as causative.² Contracted prepuce has occasioned it, relief being prompt and entire after circumcision.³

As the disease progresses, every symptom is, of course, aggravated; and particularly the desire of micturition. *Habit* powerfully influences this main symptom, and may, alone, prolong it; its agency is not, usually, difficult of detection. Health and strength soon fail; the patient gets thin and irritable; has nausea and vomiting; feels atmospheric changes acutely; the mucus increases in the urine, and fatal exhaustion ensues, in the event of no relief being afforded remedially. Scanty secretion and retention of urine, followed by coma, are the last manifestations. Attention may not be directed to the kidneys by local pain, or the latter may be slight and of a dull, subacute character. Occasionally, shooting pain down one of the ureters will direct our inquiries. The sensations in the bladder commonly mask the renal disorder. In view of this fact, more rigid search should be made. There are cases in which irritability of the bladder is not much complained of until the later stages; yet the disease is undoubtedly present; profuse flow of urine may incline us to suppose the existence of diabetes; certain patients have esteemed themselves *impotent*. In the female, vascularity and tumefaction, with extreme sensitiveness of the entire urethra, exist; the characters of the urine are the same; the kidneys are doubtless involved in the vesical disease, and may have originated it. Frequently, great vesical irritability has occurred from renal calculi, without any reference of pain to the region of the kidneys.

A certain cachectic condition of the system often conduces to this irritable state of the bladder; the latter not being very marked

¹ Coulson, *Diseases of the Bladder and Prostate Gland*. London.

² Scudamore; see also Note H., Appendix.

³ Coulson.

until the neck of the organ is affected; then, all the symptoms become more severe. Dr. Prout is inclined to rank many of Mr. Coulson's cases described as Acute Inflammation of the Mucous Membrane of the Bladder, and to which we have already alluded, in this category. He also would call the disease a species of *degeneration*, rather than an inflammation.

In these patients, particularly if strumous, there is great irritability of the skin, and a disposition to phthisis; the peculiar diathesis also shows itself, less distinctly, in the formation of various tumours. In such persons, the kidneys and bladder are exceedingly liable to be affected.

Excrescences, malignant or otherwise, growing from the vesical mucous membrane, occasion irritability of the viscus. Symptoms like those of calculus often arise. The non-malignant growths, provided a cachectic state of the system be not present, are only injurious by their mechanical effects; irritation, to a certain extent, is caused; its indications varying according to the bulk of the tumour. Polypi and elongations of the mucous membrane are enumerated. Civiale alludes to the possible errors of diagnosis arising from confounding partial enlargements of the prostate, and particularly of the portion commonly known as its middle lobe (see Part II., Chapter V.), with excrescences. He states that Morgagni, Chopart and Paletta have done this. Laugier signalizes the same point. The differential diagnosis between the above and malignant growths, depends chiefly upon the distinctness with which the latter declare themselves. The sound often apprises us of the presence of morbid growths. *Fungus hæmatodes* is the most serious of these. In its early stages, it strongly simulates calculus.¹ Patients usually

¹ A remarkable case in which cerebriiform cancerous tumour caused much embarrassment in diagnosis is related in the *Association Medical Journal*, October, 1854. There had been symptoms of "gravel" for a long time; then followed spasmodic stricture; sounding detected a calculus; lithotomy was performed, but no stone could be found. The patient declined and died. *Post-mortem* examination discovered great thickening of the vesical coats, with sloughing at one part; in a cyst, or sac, on the left side of the bladder, were four calculi "of the size of French beans." A cerebriiform, cancerous tumour, of considerable size, was found—from the upper surface of which sprang a sort of mammary process, which, when the bladder contained a quantity of urine, projected into its cavity, permitting the contact of the sound with the calculi; but, when the bladder was empty, by the collapse of its coats, the said process rolled into the mouth of the sac, closing it so completely, that it was quite impossible to grasp a stone; thus clearly accounting for the unsuccessful termination of the operation. The calculi were of lithic acid internally; externally, triple phosphate.

present the cachectic aspect above referred to. Malarious residence increases this. When the disease begins in the kidney, its appearance in the bladder may be gradual. The constant and most marked symptom is hæmorrhage.¹ The urine is mixed with blood, sometimes offensive and clotted, at other times, nearly pure. In advanced stages, this discharge may be nearly continual. The contact of the sound, in exploration, will cause it, often profusely. Debility, of course, rapidly follows, and a fatal termination is inevitable. Occasionally, portions of the diseased mass come away with the urine, and their nature may be determined by microscopic examination. The affection is said to be most common about the vesical neck, and when extensive, much irritability always exists. Calculus may be complicated with the fungous excrescence.² Symptoms, if we except the bleeding, are often liable to mislead. *Direct exploration* is imperatively demanded. There may be very severe pain; in certain cases it is inconsiderable. (Civiale.)

Difficulty in passing water is sure to occur when the tumour is large and near the neck of the bladder. Retention of urine is not uncommon, arising both from obstruction and spasm; and occasionally from stricture at the neck. Civiale quotes from Zacutus, a case where the excrescence, in the latter situation, was of the size of a goose-egg. Erhart knew of fatal retention from a similar obstruc-

¹ Laugier remarks that this, even, is not an unfailing diagnostic sign. Encephaloid tumour of the vesical trigon bleeds easily. Generally, the sign is available.

² A very interesting case, where a most accurate diagnosis was made by Professor Nélaton, is reported in the *Gazette des Hôpitaux* for April 28th, 1857. The patient, a man of about 40 years, presented himself at *L'Hôpital des Cliniques*, with symptoms indicating a complex affection of the urinary organs. The chief complaint was difficulty in passing water. In Brazil he had had lithotrity performed; a tumour subsequently arose in the right hypogastric region, into which an incision was made, and after deep exploration by the operator's finger, some pus was evacuated. Other tumours, however, appeared; the patient was sent to Paris, and M. Nélaton decided that they were of a cancerous or fibro-plastic nature, and that nothing effectual could be done for the patient. The necroscopic examination justified the diagnosis, but there were also two large, and a few smaller calculi in the bladder. The tumours were of "cancerous fibro-plastic" nature, and presented sacs or pouches filled with fluid and altered blood. They were *extra-vesical*, and sprang, originally, from one of the *rami* of the pubis. There was no perforation of the bladder, and consequently no communication of its inner surface with the tumours. The iliac artery was much dilated above the point of compression exercised by a portion of the tumour, and resembled a loop of small intestine coiled upon itself.

The whole account of this case is worthy attentive perusal.

tion. Fortunately, these growths are generally small. Nearly all writers refer to occasional great obscurity in diagnosis. Desault removed a fungous growth which he perceived with the finger, while operating for stone. The touch was in this instance a diagnostic means very rarely at command. When the fungus involves the mouth of the ureter, as in an extreme case related by Sir B. Brodie, that canal becomes enlarged, and the kidney, if not already affected, soon shares in the disease. Serious aggravation of the symptoms is certain, and the increased duty demanded from the other kidney soon declares itself.

True cancerous disease more commonly attacks the bladder than any of the urinary organs; it is *infrequent* in all. By propagation from the uterus, vagina, or rectum, it is not unusual. Idiopathic vesical cancer is exceedingly rare.¹ Dr. Prout had seen no case where it originated in the organ or its appendages. Disordered vesical sensations, in an individual cancerously diseased in other organs, should induce suspicion of like degeneration in the bladder. The existence of the cancerous cachexia would be corroborative. Sharp pain is not constantly present. When scirrhus of the vesical walls ulcerates, there is excruciating pain, aggravated by the contact of the urine, which fluid often resembles the "washings of flesh,"² and is of a foetidity *sui generis*, much more offensive than any voided in vesical catarrh. Civiale says these indications are of rare occurrence, and that diagnosis, especially in the early stages, is very difficult.³ The peculiar *facies* of those cancerously diseased soon declares itself, after the local invasion.

Vesico-vaginal fistula often results from cancer communicated to the bladder from the uterus and vagina. Previous retention of urine then ceases. Civiale believes that cancer of the bladder is a

¹ We have notes of certain lectures by M. Pigné, for many years Curator of Dupuytren's Museum (*Pathological Anatomy*), Paris; and, upon the subject of *Cancer of the Bladder* we find him stating that he knew of but 14 cases (this was in 1846); one specimen of scirrhus which he showed to us was of the size of an English walnut. The bladder, by striving to expel these tumours, which are to it like foreign bodies, becomes hypertrophied in various degrees. It is easy to see that calculus may often be thus simulated.

² Laugier et alii.

³ Dr. Lambl (*Vierteljahrsschrift für die Praktische Heilkunde*, 1856) has a paper upon the *diagnosis of vesical cancer*, and which is illustrated by four lithographed plates. The size of the cells, microscopically seen, and their form and composition, have enabled the author to diagnose cancer of the bladder, and necropsy has confirmed his opinions.

frequent termination of other affections, as prostatic *engorgements*, fungous growths, &c. In this opinion he is alone, so far as our researches extend. Chopart distinctly denies the possibility of this, and, with Desault and Lallemand, holds the common opinion of the rarity of cancer of the bladder.

Thickening of the vesical tunics (the result of inflammation), with contraction, sometimes causes irritability of the bladder; an enlarged or diseased prostate gland will induce similar symptoms. Stricture of the urethra, when neglected or ill managed, is another cause. We have previously alluded to gouty and rheumatic inflammation as often productive of excessive vesical irritation. Micturition is distressingly frequent. Prout calls attention to the propagation of *gouty irritation of the urethra* to the bladder. This urethral affection sometimes assumes all the characters of violent gonorrhœa.¹ Extreme sexual excitement seems at times capable of producing irritable bladder.

Irritability of the Bladder from Disturbance of the Nervous System.—Causes partaking of this character often occur. Sir B. Brodie likens the state induced to that of certain other parts in which spasmodic action is manifested, as seen in the involuntary twitching of the eyelids, and in other muscular disturbances of the sort. Habit is very powerful in these instances. In all cases, the bladder gradually becomes contracted, by dint of constant muscular effort at excretion; it will therefore contain less urine than when healthy, and thus the evil is almost momentarily increased. The resolution of the patient may do much in remedying this. Brodie mentions cerebral disturbance (owing to altered structure of the arteries of the brain), manifested by giddiness, &c., which is often accompanied by irritable bladder. In such cases, the urine may be quite healthy, and the bladder free from disease; the frequent micturition being entirely dependent upon the cerebral disorder. Dr. Prout has found the urine, in certain of these instances, "of high specific gravity, and abounding in urea, or in lithic acid."

Vesical Spasm.—Spasm of the bladder is nearly allied to the affection above considered. It is often merely symptomatic of stone. The kidneys, rectum, and uterus, when diseased, may induce it. Authors mention its *periodical* recurrence. A sharp pain,

¹ When rheumatic and gouty irritation exist simultaneously, the vesical disorder is still more intractable; if hereditary predisposition be certain, diagnosis is assisted.

with a sudden, drawing sensation, often propagated to the urethra, and causing distressing priapism, are the chief symptoms. After a time, the urine is often retained; occasionally suppressed. When the latter occurs, there is extension of the pain upwards to the distended ureters, and to the kidneys; downwards to the testicles, and into the loins. Nausea and hiccough may accompany. On palpation over the vesical region, the bladder is found closely contracted, and may be felt like "a hard ball." Tenesmus arises from its pressure upon the rectum; protrusion of the latter has been observed. Uneasiness, agitation, and cold perspiration are added. Syncope, convulsions, and death, sometimes ensue. Very acrid urine, or pus, derived from any of the urinary organs, may produce vesical spasm;¹ retention of urine, gout, excessive venery, ascarides and intestinal obstructions are also cited as causes. Sudden application of cold to the neighbourhood of the organ sometimes excites it. It may terminate, if its cause be not removed, in paralysis of the viscus.

Paralysis of the Bladder.—This is most frequently observed in old age,² but may occur, suddenly, from certain local injuries of the brain or spinal marrow. In the aged, an enlarged prostate may prevent entire excretion of the urine. A certain amount is retained, which gradually increases, till finally the power of contraction is lost by reason of continuous distension. Involuntary discharge, by dribbling, next takes place; great vesical and renal disorder gradually ensues. A sense of weight and uneasiness in the vesical region exists, with cramps and numbness of the legs, and difficult defecation. Frequently, little pain is experienced, and the patient is hardly conscious of his state. Paralysis of the bladder, caused by accidents, or traceable to lesion of the nervous centres, is so distinctly marked, diagnostically, that it need only be mentioned. Under the title *Anæsthesia Vesicæ*, M. Philipeaux has lately noticed a condition of the bladder which may, in his opinion, not be sufficiently distinguished from paralysis of the organ. He declares that only one case has hitherto been recorded, which rightly describes the condition, and that one was reported by Dr. Duchenne, of Boulogne, in his work on electricity locally applied.

¹ "The pain in *cystitis*, is burning, throbbing, lancinating; in *spasm*, it is oppressive, dragging, and resembling labour-pains." (Prout.)

² Mercier, Coulson, and others, think this affection not so common in the old as is supposed; Sæmmering thought otherwise.

According to M. Philipeaux, *local electricity* is at once the surest diagnostic means to ascertain the existence of the affection, and also the best remedial measure. If *anæsthesia vesicæ* be present, the electrical fluid directed upon the bladder will produce no pain (*Gazette des Hôpitaux*, Feb. 1857.)

Mr. Coulson states that some persons, particularly stout females, pass urine involuntarily, when lifting heavy burdens; there is, of course, sufficient force in the action of the abdominal muscles and diaphragm (as Mr. C. suggests), to overcome the sphincter of the bladder. Paralysis would hardly be supposed. We have known middle-aged and elderly people¹ lose urine, by jets, while in the act of long and hearty laughter; the action is undoubtedly similar to that above noticed.

Retention of urine during pregnancy, caused by pressure on the neck of the bladder and commencement of the urethra; retroversion of the womb, and its prolapsus, productive of the same symptom, must be remembered and distinguished from paralysis proper, although, by persistence of the causes, such a state might follow. The bladders of great drinkers acquire an enormous capacity and power of retention; it is evident that such a tax upon the organ, when habitual, must prove very deleterious; the muscular coat might wholly lose its tonicity. M. Sandras speaks of what he terms "*urinary paralysis*," as a consequence of renal or vesical lesions, which have weakened the system; and he thinks that a paralytic state which has caused retention of urine, habitual distension of the bladder, or vesical catarrh, may, after some time, prove the source of grave lesions of the genito-urinary apparatus.

Many, however, disagree with him. M. Leroy d'Etiolles, the younger, has written a thesis (Paris, 1850), to support the proposition that there is *paraplegia* produced by disorder of the genito-urinary organs. He says that this was first noticed by Adelina-fonte, who lived in the last century. Mr. Stanley, of London, M. Rayer, and others, have maintained the same opinion.

A "Memoir upon Dynamic or Nervous Paralysis," published in the *Gazette Médicale de Paris* (1857), supplies us with the above facts; and several cases are related.

While considering the vesical affections depending upon nervous derangement, that termed by Civiale *neuralgia of the neck of the*

¹ Females, in every instance.

bladder, should be mentioned. He devotes much space to its investigation, and cites many illustrative cases. Spasmodic contraction, sharp pain, difficulty of urinating, and general deterioration of the health, are remarked. Caution should be exercised not to confound sensations of the uterine neck and mouth, with those arising from the corresponding vesical region. A morbid condition of the rectum often occasions symptoms wrongly referred to the bladder. Venereal excesses, and particularly masturbation, have induced neuralgia of the neck of the bladder. Civiale mentions a very obstinate case which depended upon this habit, and which was examined by M. Chomel and himself, without discovering any organic lesion or mechanical cause. At last, the habit referred to was ascertained, and the affection rightly ascribed to its agency.

III. AFFECTIONS OF THE BLADDER REFERABLE TO HYSTERIA.

This is a class of cases in which a correct diagnosis is only second in importance to that of structural disease; and the difficulty of forming it is often greater. Much mischief often springs from mistakes entirely due to the peculiar character of the acting cause.

Nearly every form of urinary disorder may be imitated by the hysteric female. Dr. Prout draws particular attention to this fact. He examined, in "innumerable instances," calculi said to have been passed *per urethram*, and found them to consist of fragments "of silex, or even of brick; in short, of anything, but what is known to be of urinary origin." The importance of analytical chemistry here impresses us; no imposition can be passed upon that.

Not vesical symptoms alone, but renal, are very accurately imitated. The passage of a calculus from the kidney to the bladder has been feigned with extraordinary success; and none who were spectators, or had heard the description of symptoms, were undeceived until the examination of the supposed calculus (which is always produced, without regard to anachronism or other absurdity), exposed the deception.

The furtive introduction of powdered chalk, or quicklime, into the urine, has been practised with perfect success, in arousing suspicion of disordered urinary secretion. Urine, nearly black, being sometimes voided by the hysterical, they have artificially prolonged the appearance by the use of ink! Dr. Prout states that in these

cases he has seen the urine strongly serous, mucous, and even tinged with blood, "*as it were at the will of the patient.*" To cope with such subtilty, great tact on the part of the physician is required. Excessive discharge of urine, although of itself an hysteric symptom, may mislead, *if persistent*. More frequently, seeming suppression exists; retention is not uncommon. The latter may arise from that unfortunate pruriency which finds gratification in the contact of the fingers and instruments employed in relieving the bladder, to procure which, the patient retains her water. In other instances, simple *want of volition* causes retention; the patients, says Mr. Druitt, are not unable to empty the bladder if they try, *but they are unable to try*. It is obvious that serious disease may be induced by this morbid condition of the mind and moral sense. The practitioner cannot trust his patient for information; his diagnosis must be independently made. If accustomed to the hysteric aspect and trickeries, a clue will usually be obtained. Accurate chemical analysis is inestimable in all such cases. Sooner or later, the case will become clear. If fortunate enough to witness a genuine hysteric paroxysm, little doubt can remain. The habits, education, moral elevation, and especially the state of the menstrual function, must be well considered. Those in high station will be more refined in their deceptions; the lower classes perhaps more absolute, but more easily detected.

Dram-drinking¹ is likely to produce a quasi-hysterical state, and may, at first, contribute to an exaltation of the genital instinct, productive of certain of the manifestations alluded to. The *age* of patients, for obvious reasons, is valuable as a diagnostic element. Irritable bladder may be simulated in hysteria. Often, however, there is less feigning, than actual *sympathy* on the part of the bladder with the neighbouring organs. The *critical period of life* may predispose to irritability of the bladder, and the symptoms, in such instances, should not incautiously be attributed to hysteria, still less to organic disease. Excited action of the bladder is often associated with the uterine derangement then experienced, and sometimes so early as to offer the first announcement of the coming change. Recognition of this fact will prevent any unnecessary treatment.²

¹ It is important to remember that this habit is by no means confined to the lower classes.

² Henry Thompson, Esq., *Lancet*, 1854.

IV. TUMOURS AND THICKENING OF THE ENTIRE VESICAL WALLS.

It is not easy to diagnosticate these during life. Pathological anatomy reveals partial thickening of the coats of the bladder, forming an evident and circumscribed tumour; occasionally, the enlargement is more diffused. Andral, Rokitansky, Ancell, and others, refer to tubercle developed in the walls of the bladder; a degree of tumefaction may exist around such a deposit, and also induration and thickening, independently. Civiale and other writers refer certain neuralgic pains, and the persistence of catarrh of the bladder, to these enlargements. In rare instances, a large prominence may be felt in the hypogastric region, particularly in thin persons. Sometimes, examination by the *rectum* discovers hardness and tumour in the portion of the bladder corresponding to the intestine. There is mucosity and foetidity of the urine, which, in some cases, contains "pieces of flesh;" micturition is frequent and painful. The chief reliance must be placed upon discovery of the tumour by palpation.

V. WOUNDS OF THE BLADDER.

These are generally easily recognized. They are not properly "diseases" of the organ, but so often induce subsequent disorder, that a few words respecting them are appropriate.

Peritonitis, with its usual symptoms, is declared, if the peritoneum be injured before the bladder is reached. If the portions of the organ not invested with peritoneum be divided, diffuse cellular inflammation, ending in gangrene,¹ from urinous infiltration, ensues. Foreign bodies, as balls, &c., may remain in the wounded bladder, and finally give rise to symptoms of stone. When injuries of any extent are inflicted on the bladder, death commonly occurs too soon for any such manifestations.

¹ The bladder sometimes sloughs after excessive retention; also after typhus fever and extreme inflammation of the viscus itself. Mr. Coulson particularly instances the inflammation of the muscular coat, as sometimes presenting this sequel.

VI. RUPTURE OF THE BLADDER.

This accident is in the same category with wounds; it may, however, occur after actual disease, as softening, or gangrene, &c. If life be at all prolonged after this terrible accident, some doubt may arise. Violent contusion of the abdomen, especially if near to the vesical region, and inflicted when the bladder is full, is the most common cause. Necroscopy reveals one situation as constant for this laceration, viz., at the posterior and inferior part of the viscus, at the sacro-vertebral angle. Rupture—unless the organ be considerably distended—is hardly possible, except the tunics are diseased. The mechanical action of the bony prominence referred to, seems indisputable. There is, of course, no natural flow of urine, and violent peritonitic symptoms soon arise.

VII. INTESTINO-VESICAL FISTULA.

This is unusual; it arises occasionally from cancerous disease of the rectum and vesical neck, an opening between the organs being made by ulceration. Abscess of the prostate may cause a like communication; perinæal lithotomy has been the agent. (Laugier.)

The accident is recognized by the issue of fæcal matters and gas with the urine; the latter is mucous, and of fæcal odour, even when no such ingredients are contained in it. Intestinal worms sometimes pass with the water.¹ A case of evident communication of the intestine with the bladder is recorded, in which, nevertheless, Dupuytren operated for stone, by the bi-lateral method; the patient passed a lumbricus, and also gas, *explosively*, from the urethra. His urine was mucous and foetid, yet he went out of hospital (Hôtel-Dieu) in a "satisfactory state." Vesical catarrh and calculi are common in these cases.²

¹ See Appendix, Note I.

² Vesico-vaginal fistula is known by the constant flow of urine. It is referred to in another place.

VIII. VARIX OF THE BLADDER.¹

Vesical varix is very difficult of recognition. Shaw, Civiale, and others, deny its existence at the vesical neck; there are instances which prove its occasional occurrence there. Its chief signs are hæmaturia, dysuria and ischuria. These are so frequent in other affections, that the diagnosis is embarrassing. If there be hæmorrhoids, or varicose veins elsewhere, the above symptoms would lead us to suspect their existence in the bladder.

The following case (*Gazette des Hôpitaux*, July, 1854) illustrates the serious nature of this affection. A patient under the care of Professor Laugier at L'Hôtel Dieu, and who had periosteal exostosis of the femur, after being in the ward a few days, was attacked with profuse hæmaturia. The blood was black and pure; not mixed with urine; the bladder became greatly distended, and was felt very high up in the abdomen. The hæmorrhage evidently took place by regurgitation; no lesion could be detected by catheter or sound; no tumour or fungous growth was found in the prostatic region. There had been previous pyelitis, announced by sharp pain in the situation of the kidneys, and a degree of paraplegia; these symptoms had not wholly ceased. The discharge of blood from the urethra persisted, with short intervals, and at times was very abundant; cold applications, and various other means, perseveringly employed, were of no avail. The patient died, gradually worn out.

The *post-mortem* examination disclosed *voluminous varices upon the neck of the bladder*; one was ulcerated and largely opened; by this gaping wound the blood had issued. The powerlessness of art in such a case is evident. The reporter remarks: "Bonet, Morgagni, Chopart, Desault and others mention instances. Other lesions, however, were co-existent, which tended to produce or maintain the varicose condition. In most of the cases related by them, vesical calculi or prostatic tumours were conjoined. Desault and Chopart report cases where no foreign body was found. These were observed in persons who returned to France from the Antilles, affected with varicose veins." The abuse of excitants, so common in many warm countries, and various excesses producing afflux of blood to the genito-urinary apparatus, or its *stasis* therein, contribute to this

¹ See Appendix, Note I.

condition of the vessels. In the case above related, the varices were uncomplicated with foreign bodies, tumours, &c.; nor had climatic influences been brought to bear upon the constitution. "On concevra aisément, en presence d'une semblable lésion, combien il devait être *difficile de porter un diagnostic précis et rigoureux*, et combien surtout la thérapeutique était désarmée." (*Loc. sup. cit.*)

Dysuria and ischuria are quite constant in vesical varix; a dark-coloured blood is of a certain diagnostic value, although seen in other affections.

IX. DISEASES BY DISPLACEMENT.

CYSTOCELE.—*Varieties.* Inguinal, crural, perinæal and vaginal. The first is the most frequent. Males, and particularly the aged, are more subject to it than females. Calculi are often contained in the vesical pouch. Mr. Pott relates an instance in a child of six years where calculus accompanied. A tumour is manifested, its size varying according to the amount of urine in the bladder, and also as to the degree of pressure exercised upon the extruded portion. When the bladder is empty, calculi, or a hardness due to their presence, may be felt. *Pressure made over the tumour, excites a desire to urinate*; and this occurs when the other portion of the organ is emptied; a certain amount of urine may be retained in the herniated part, and without this, even, such a sensation might be excited. This is an exceedingly important sign, and is common to all the varieties. When the patient makes an effort at micturition, the tumour is distended. Inguinal cystocele becomes quickly irreducible, by reason of its contracting adhesions. Civiale quotes from Ruysch a case in which the bladder became herniated, together with a loop of intestine, into the scrotum. The patient could only pass water by lifting and pressing the scrotal tumour. The diagnosis was easy. The scrotum in such cases is often greatly distended; if there be retention of urine, we naturally suspect cystocele.

The relation of *hydrocele* to the testis generally serves to distinguish it from cystocele. Laugier remarks the delicacy of diagnosis required in discriminating between cystocele and encysted hydrocele of the spermatic cord; also from similar tumour of the round ligament of the uterus, or from that of extruded ovarian sac, in certain cases. Carefully practised exploratory puncture would

determine the question by the character of the evacuated liquid. Fatal peritonitis, however, has been caused by simple puncture.

Vesical hernia becomes, at times, strangulated. The symptoms are analogous to those of intestinal hernia. Vomiting comes on later in the former and is preceded by hiccough; which order is reversed in the intestinal obstruction.¹

Crural cystocele is far less common; its symptoms are the same. The perineal form is seen in the pregnant female and in old men. It is particularly rare in the latter. Pressure of the gravid uterus appears to be causative; the tumour is in the perinæum, somewhat laterally of the median line. It disappears after delivery and recurs in succeeding pregnancies. Hartmann found, on necroscopic examination, a large calculus in a perineal cystocele, which could also be felt through the integuments. If this were recognized during life, it would be sufficiently diagnostic. Strong desire to urinate, in old men, connected with perceptible tumour beneath the skin and recto-perineal aponeurosis, indicates a vesical lesion of hernial nature. The fibres of the levator ani are separated by violent expulsive efforts, and thus allow the hernia. The signs are the same as in the other forms. The affection is illustrated by a case from Pipelet,² quoted by Civiale and Laugier.

Vesical hernia into the vagina (*Cystocèle vaginale*)³ selects the anterior wall of that passage; is most common from the age of 20 to 40 years; may be of the volume of a child's head (Robert), but is usually smaller; causes frequent desire to micturate, and, quite often, pain in the act; may be known by its extreme fluctuation and by the increase of inclination to pass water on pressure being made; by the protruding of the tumour between the labia, elevat-

¹ J. L. Petit.—Mr. Coulson intimates a doubt of the possibility of strangulation. (*Op. cit.*, p. 259.)

² "Pipelet saw this accident in an old man, after two efforts made with the legs widely separated (at stool?): these exertions caused a separation of certain fibres of the levator ani and of the transversus perinei, which allowed the fundus ('*bas-fond*') of the bladder to pass through and caused a bulging beneath the aponeurosis (superficial) of the perinæum and integuments. The tumour was of the size of a hen's egg, soft, reducible, but recurrent and caused a frequent desire to urinate; by pressure upon it, the patient passed more water than at other times. It was retained by a bandage." (Version of M. Laugier, *Dict. de Méd.*, en 30 vols.)

³ Dr. Golding Bird described cases of prolapsus of the bladder into the vagina, causing the anterior wall of that passage to project between the labia, and painful symptoms to arise from retention of a portion of the urine and its decomposition in the bladder.

ing the urethra and clitoris. Malgaigne and Laugier incline to think it possible that the efforts of parturition tend to produce this accident, but it certainly often exists independently of this cause. Distension of the vagina at such periods, must predispose to it, when not previously present. Coughing causes the descent of the sac, as in intestinal hernia. Ruysch saw a remarkable case in an unimpregnated female, which he recognized by palpation, calculi being felt, and 42 of them taken away, subsequently, by incision, recovery ensuing.

Sacs, formed by the passage of the vesical mucous membrane through the muscular fibres, are observed *post-mortem*; their recognition during life is rare, and not positive, in any case. A sacculated condition of the bladder may be suspected, when, on catheterism,

Fig. 14.



[Sacculaton or partial dilatations of the bladder; section of the bladder and prostate. *a*. Mucous surface of the bladder. *b, b*. Lateral lobes of the prostate. *c*. Middle lobe. *d*. Large cyst or pouch, partially laid open, and communicating with the bladder by a small orifice. (From Gross on the Urinary Organs.)

all the urine does not flow at once, but only after repeated efforts and change of the patient's position, together with pressure over the hypogastric region, which cause renewed issue of urine. A curious mode of formation of a pouch in the bladder is by insertion of a portion of peritoneum through the muscular fibres, the latter becoming columnar, by hypertrophy of tissue. This would hardly

be recognized during life, unless a loop of intestine were to descend into it and become strangulated. Hippolyte Cloquet saw one such sac, on dissection, in a man of sixty. Double bladder, as it is termed, is probably formed by a process of sacculation.

X. VESICAL ABSCESS.

Abscess of the vesical walls may be confounded with the above condition of the bladder. Generally, diagnosis is somewhat difficult. In addition to the presence of pus in the urine, certain other signs assist us. Bonet, Ruysch, Hellwig, Chopart, Civiale, Wilson, Coulson and others mention abscess in this situation. The causes are often inappreciable. Blows upon the vesical region; foreign bodies introduced into the organ, accidentally or designedly; stricture of the urethra or of the vesical neck (an affection of late particularly noticed by M. Caudmont, of Paris) are among those usually recognized. Purulent discharge, alone, is not sufficient; the pus may come from the kidney,¹ from the urethra, or from sacs of the bladder. The abscess may not open into the bladder. If it discharge externally, through the abdominal walls, safety would alone be insured by adhesion between the latter and the bladder; the case is critical. If there be any tumour formed over the site of the pus, diagnosis would thereby be aided. Such swellings, however, have led to erroneous conclusions. Civiale cites Colot and Home as successful in diagnosing these cases, but refers to the failure of Hunter, who mistook one for ascites. Verdier mentions an enlargement of this sort mistaken for venereal abscess. The actual cautery was applied, the eschar incised, and a calculus, at the bottom of the wound, together with a flow of urine, disclosed the grave error. Frequently there is no external tumour. The pain has no constant or special character; it is usually dull and heavy, and confined to the vesical region; at times there is none whatever. Examination by the rectum is rarely of any avail. Such cases are exceedingly difficult of recognition. Occasionally there are rigors, with strong febrile excitement and uneasiness in passing urine and feces. Mr. Coulson refers to abscess in the bladder as an occasional termination of the affection described by him as "Acute Inflammation of

¹ Search for "tube-casts."

the Muscular Structure of the Bladder."¹ Rigors and great constitutional disturbance mark the onset of this disease. The pulse is full and hard, with hot skin and excessive thirst. Abdominal pain, and finally great uneasiness and tenesmus in the rectum; delirium; sinking of the pulse and death, is the succession of phenomena.

If the *neck* of the bladder be inflamed, there is retention of urine, owing to the tumefaction; the bladder becomes distended and may be perceived on palpation; a sense of weight is felt in the perinæum; there is often painful erection of the penis, and suffering is occasioned by rectal examination.

We have previously alluded to the exceeding difficulty of pronouncing upon inflammation confined to a *single* vesical tunic. That it may exist, is very likely, but *how long*, without communication to the other coats, is at least problematic.

In the case which Mr. Coulson gives as one of the best illustrations of this form of inflammation, he states that he found "the bladder in a state of intense inflammation;" in its structure, no organic change was discovered, but "the tunics (i. e. *all* of them), particularly the muscular one, were of a very deep red colour," which latter was retained after the preparation had "been in spirit several years." Gout, especially if an attack have been suppressed, is considered a cause of this species of inflammation. If at all metastatic, the muscular coat would be likely to be *first* affected, but propagation would undoubtedly be rapid.

XI. SUPPRESSION, RETENTION, AND INCONTINENCE OF URINE.

These are often symptoms of disorder remote from the bladder; and also occur, as we have already seen, from actual structural disease in the urinary organs.

Suppression of Urine (Ischuria renalis).—This is either partial or complete; it may arise from inflammation or spasmodic action; and sometimes it is due to mechanical causes. No urine is separated from the kidneys while this condition lasts. If there be renal disease, we have correspondent symptoms. Gout, if the patient be subject to it, may be suspected as a cause. The same is true of hysteria, but the suppression is then more dependent upon spasm

¹ On Diseases of the Bladder and Prostate Gland. London.

and less likely to continue, unless the patient is very unmanageable. We suppose a mechanical cause, if indications of calculus have existed. The constitutional symptoms are anxiety, restlessness and a feeling of fulness and distension about the abdomen and in the loins. Disinclination for exertion, hiccough and nausea succeed. After a time, a urinous odour is exhaled from the patient; the pulse is weak and slow; drowsiness, low delirium, convulsions and fatal coma are observed.

Children, and very old persons, are most liable to suppression. In extreme old age, gout or renal inflammation are usually conjoined with ischuria. Dr. Prout regards the recoveries after vomiting of urine, pretended or supposed to be suppressed, as instances in which the affection is referrible to hysteric deception.

Retention of Urine.—Retention is, at first, declared by pain in the vesical region, with desire to pass water. The abnormal condition persisting, the bladder becomes enormously distended by the constant increase of urine; and the tumour thus formed is at last appreciable by the fingers, and ocularly. Catheterism removes the symptoms and establishes the diagnosis. Neglected retention is fatal—its early detection of the highest importance.¹ Partial or entire paralysis, rupture and gangrene of the bladder, result from over-retention. Obstruction in the urethra, or constriction and spasm of the vesical neck, may cause this affection. In paralytic attacks, hysteria, and many forms of low fever, its possible occurrence should not be forgotten.²

Dysuria, or difficulty in voiding urine, is connected with retention by constituting a minor degree of it. It may be aggravated into complete retention; it is frequently a symptom of existing renal or vesical disease, or may be only a momentary arrest, with or without pain; sometimes the suffering is intense.

Long *voluntary* retention of urine; its acridity; gonorrhoeal, vesical, or prostatic inflammation, or even irritation; intestinal worms; scybala; urethral stricture; and, indeed, any source of obstruction or irritation about the pelvic organs, or in the kidneys, may induce dysuria.

¹ See Appendix, Note J.

² M. Krause (*Zeitschrift für ges. Medizin von Oppenheim*, t. xxix., No. 2, 1845; and *Archives Générales de Médecine*, Janvier, 1846) met with a case of *hæmorrhoids of the bladder*, of such severity as finally to compel puncture of that organ, in order to relieve retention of urine. See the detailed account, as above.

Strangury is a violent and very painful degree of the symptom, often caused by cantharides externally or internally used. Under the head of "Spasm of the Bladder," Mr. Coulson refers to the strangury of arthritic patients, and alludes to Sœmmering's remark that blisters to the calves of the legs often remove the symptoms which in other affections they sometimes induce. Possibly the homœopaths might warp this into evidence in favour of their doctrines.

Incontinence of Urine (Enuresis—nocturna et diurna).—This condition springs from various causes. It is a symptom of *retention*, in one sense; for, when the bladder has become greatly distended, the resistance of the sphincter vesicæ is finally overcome, and the urine dribbles away with more or less rapidity. In a case related by Mr. Lawrence, the discharge, in this manner, was so continuous and copious, that the existing retention was overlooked, until Mr. L., on examination, discovered the superior margin of the vesical tumour far above the umbilicus, and by the catheter drew off five pints of urine. The case had been mistaken by the previous attendant for one of *extremely irritable bladder*; he had given diluents and allowed the distension to go on for five days; the dribbling of urine being considered by him an evidence of the supposed irritability of the organ, and "*that it would hold no water at all!*" The importance of accurate diagnosis in these cases is too evident to be insisted upon. The result of the error in the above instance was permanent loss of the expulsive power, and the constant need of the catheter, which the patient, himself, learned to use.

In delicate children, incontinence of urine is common; mere weakness may induce, while habit will prolong it. Dr. Prout has noticed gravelly deposit in these cases, and thinks the acidity of the urine may occasionally cause it to pass off during sleep. According to him, lying on the back often keeps up the habit of nocturnal urinary flow. In adults, irritability of the bladder, especially of its neck, and disease of the prostate gland will bring on this troublesome affection. An hereditary character is ascribed to it by certain authors, and it is remarked that females are most liable to it. The good effects of a tonic treatment enlighten us in many cases. Undoubtedly a vicious diet may contribute to, if not induce, this trouble. The urine should be tested in all obstinate cases. Those who drink largely at or near bedtime, may have nocturnal enuresis, if very young, or extremely old. Inquiry should always be made as to the habits in this respect.

XII. VESICAL CALCULUS.

Strictly speaking, calculus in the bladder is not a "disease" of that organ; but from the discomfort and frequent injury entailed by its presence, its early recognition is important. The symptoms are quite marked after a certain time, but the chief diagnostic information is surgically derived. If there have been evident signs of the descent of a renal concretion into the bladder, and no passage thereof *per urethram*, we expect, sooner or later, to have vesical symptoms indicative of the presence of a foreign body. All authors agree that calculus, *generated in the bladder*, is extremely rare; an introduced nucleus is the rule of formation. Dr. Prout doubts "whether lithic acid and oxalate of lime concretions are ever formed in the bladder." The urine generally holds these principles in thorough solution. Phosphatic and cystic oxide calculi may, according to this writer, be occasionally "formed on nuclei of their own substance deposited in the bladder itself." A clot of blood or inspissated mucus may be gradually surrounded by incrustation. Foreign bodies are introduced into the bladder, wilfully or accidentally, and, unless instantly withdrawn, become nuclei for stone.

A description of the different varieties of vesical calculus is uncalled for at this time; *how may their presence be known?*

Dr. Prout lays great stress upon "a competent knowledge of the constitutional symptoms attendant upon the different calculous diatheses." Any extended examination of these would require more space than can here be allotted to it. The practical means at our command for recognizing the existence of stone will therefore now particularly engage us; and the influence of the various diatheses will be considered in a future chapter.

Mr. Coulson says, the preliminary to the production of urinary calculus is "the saturation of the urine with that substance which is about to pass into the form of a calculus." In the different forms of calculus, the modes of precipitation of the formative constituents vary in but trifling degree. When supersaturation of any salt takes place, the excess must be finally deposited. (Prout.) We may eliminate the chemical and physiological questions from our subject, and proceed to consider the *actual manifestations* of stone in the bladder.

All ages are obnoxious to vesical calculus. Hippocrates saw it

in an infant at the breast. Instances of its *intra-uterine* existence are given.¹ Stahl found a stone of the size of a peach-kernel in an infant three weeks old; great distress had been suffered on urinating. Mr. Coulson mentions extracting calculi from children under three years of age; his youngest patient was eighteen months old; his oldest, eighty years.²

In children, who can only make known their sufferings by cries and gestures, the latter are, fortunately, eloquent. The pulling at the end of the penis is characteristic and constant; the little patients elongate the prepuce with the fingers, supposing the sensations they experience will thereby be alleviated. When calculous children keep their hand upon the penis,³ it is a significant hint to the surgeon. Those who are inexperienced, might correct the child for a habit erroneously referred by them to other causes.

In the adult, the symptoms vary much in degree. If the calculus have passed from the kidney, and be arrested in the vesical orifice of the ureter, the obstruction and distension of that canal, and of the tubular structure of the kidney, soon declare themselves, in the majority of cases. Renal symptoms will nearly or entirely exclude the vesical. When loose in the cavity of the healthy bladder, the

¹ Dr. Yandell (*Nashville Journal of Medicine and Surgery*, 1854) had a case of calculus in a girl of thirteen years, "the subject of stone since early infancy; her mother thinks *from birth*." Operation by the bilateral method removed (with difficulty, on account of the great size of the stone) a calculus, the size of a hen's egg (rather indefinite, in these days!) which had, however, to be broken into "nearly one hundred fragments" before it could be extracted. The account does not state whether the patient had ever been previously relieved by lithotripsy of any concretions; but if stone existed since "birth," or very "early infancy," it is somewhat remarkable that the child's health endured it so long, and yet more so that no operation had been previously attempted, or solicited. Composition of the nucleus:—Uric acid; next, oxalate of lime; 3dly, phosphate of lime, triple phosphate of magnesia and ammonia; 4thly, and "outer layer," oxalate of lime.

"Dr. Brønner relates (*Würzburg Verhandlungen*, 1856) a case of urinary calculus in an infant of one year, evacuated spontaneously. This concretion was composed of urates and was six millimètres (a little more than one-fifth of an inch) in diameter. Its passage through the urethra was accompanied by violent symptoms and almost complete retention of urine."

The above is quoted in the *Virginia Medical Journal* for December, 1857; the sex of the child is not mentioned, but we presume it to have been a male. We have not the opportunity of referring to the original paper.

² Dr. Prout's researches lead to the conclusion that children until fourteen years are most liable to stone; then, persons after forty; between those periods, it is rare.

³ Or at the vulva; noticed by Hippocrates.

stone shifts with the patient's change of position. A sense of weight is felt about the neck of the bladder, with pain sometimes shooting down into the groins, perinæum and thighs. Irritable bladder comes on; micturition is frequent, and a sharp pang darts to the extremity of the glans penis as the last drops are discharged. Sudden stoppage of the stream happens at times; the foreign body blocks the urethra. These symptoms become more marked, as we might expect, with the enlargement of the stone. The pain at the close of micturition is insupportable, the body writhes and the teeth are ground with agony. Cramps take place, and a spasmodic action of the bladder itself may last for some time. Urine and semen are occasionally passed, involuntarily, during this state. Priapism is often excited. These symptoms are sometimes slow in their accession, but become at last so clear and decided that the diagnosis is easy.

It would be supposed that a sharp, spiculated¹ stone must cause the greatest pain, by its mechanical action alone; but Dr. Gross, in his work on the Diseases of the Bladder,² thinks that, owing to the easier passage of urine through the long spines of such a concretion, pain would be *less* severe. The rule is, that the larger and heavier the stone, the greater the suffering it produces. When the surface presents sharp points, we naturally refer much of the pain to their agency. More suffering is caused by the phosphatic calculus than by any other, the kidneys and urinary passages being usually in a morbid state. An encysted stone gives the least pain, and may remain, for years, undetected. If the vesical mucous membrane become ulcerated, the pain is proportionably more severe, and the calls to urinate are distressingly frequent. Exercise seems to increase the sense of weight about the vesical neck. Violent shocks, jolting in a carriage, or riding on horseback, may induce hæmaturia, which, at any rate is common after ulceration has taken place. In the aged, the urine gets thick, and stringy mucus of a dirty gray or yellow colour is passed. Prolapsus of the rectum often accompanies. If the stone have existed for a long time, seri-

¹ "Colligitur eo quod cruenta distillat, illum esse spinosum." (Celsus, *Liber*. 7, *Cap*. 26.)

² A Practical Treatise on the Diseases, Injuries and Malformations of the Urinary Bladder, the Prostate Gland and the Urethra. By S. D. Gross, M. D., Professor of Surgery in the University of Louisville, etc. etc. (now Professor of Surgery in Jefferson Medical College, etc. etc.). Second edition, revised and much enlarged, etc. etc. Philadelphia: Blanchard and Lea, 1855, pp. 925.

ous renal disease sets in, depending chiefly upon the distension consequent on the excessive dysuria. When the prostate is enlarged, the difficulty is increased, and if urethral stricture exist, the case is still worse.

Aspect of the Patient, Complications, Exploration, etc.—The patient with stone has a worn, distressed look; the brows are knit; he is thin; the skin is harsh and dry; the hands and feet are cold; the stomach nauseated; the bowels irregular; the pulse weak. Hectic symptoms finally occur in unrelieved cases, and the patient dies exhausted. The chief *early* diagnostic signs are frequency of micturition and pain at its close.

We are told that an enlarged prostate may be even alleviatory of the patient's sufferings, because it prevents the stone falling down upon the vesical neck, and causing irritation, pain, and perhaps obstruction. Gout not infrequently complicates stone in the bladder.¹ Certain tumours may produce calculous symptoms, or at least, may stop the flow of urine, temporarily, by closing the vesico-urethral aperture. If the bladder be inflamed, blood may pass, without stone being present. The only unfailing diagnostic means is the *sound*, which, unless the stone be encysted, detects it readily, in nearly all cases.

The appreciation of stone by the touch, through the sound, is, in itself, a delicate tact. The oxalate of lime, or other hard calculi, click or ring against the steel; phosphatic concretions give the sensation of striking a body, which, though firm, yields a duller or wooden sound, or perhaps none at all. Even the size of the calculus may be very nearly told, by a skilful operator, with the sound. A two-bladed instrument is devised for more accurate measurement, with a graduated scale upon its handle. In old persons, the surgeon is aided by introducing a finger into the rectum. It is well known that Laennec recommended stethoscopic examinations for the detection of vesical calculi; but the contact of the steel sound with the stone can generally be heard by the unassisted ear. The bladder has been distended by aqueous injection, in order to facilitate the communication of the stroke of the sound to the ear. (Ashmead.)

In cases where the sound fails to detect the stone,² as has happened to such distinguished surgeons as Cheselden, Abernethy,

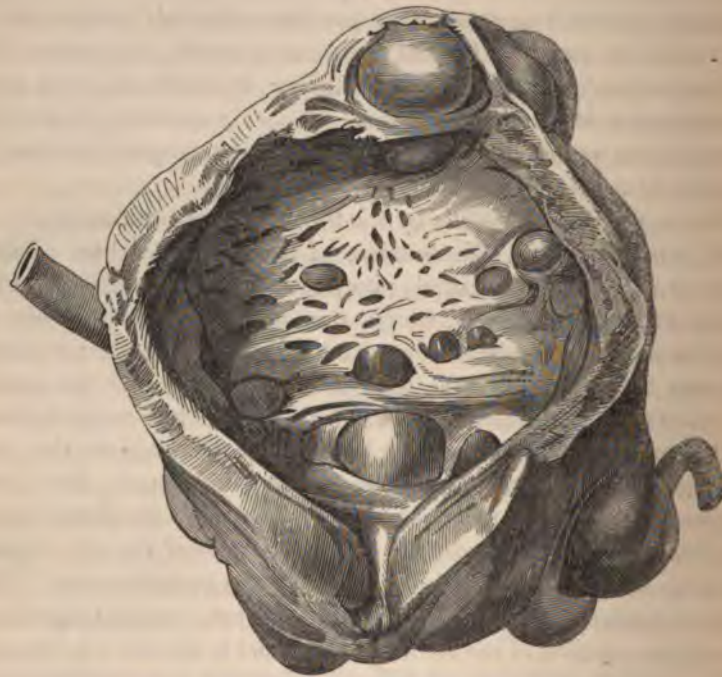
¹ Rheumatism also is occasionally a complication. See Appendix, Note K.

² From sacculation of the bladder, enlarged prostate, fungous growths at the vesical neck, &c.

Brodie, Dupuytren, Colot, Chopart and Warren, there may often be so decided indications, that an operation would be properly done at hazard. Colot extracted *twenty-two* calculi from a man 60 years of age, in whom, by sounding, he had utterly failed to ascertain the presence of *any*. They were of the size of a hazel-nut. Civiale mentions many instances where the stone was not found till after death. The distinguished Portal perished from stone, undetected until it was too late to operate.

Mr. Coulson quotes Ellerus as stating the fact of a stone being contained *between the coats* of the bladder. He also refers to an "hour-glass" shape of the bladder, where a sound could not be passed into the second cavity. In such instances, diagnosis rests upon collateral evidence alone. Calculi contained in herniary sacs

Fig. 15.



Sacculated calculi.—From Gross on the Urinary Organs.

of the mucous membrane of the bladder, formed by its passage through the hypertrophied muscular columns, are in the category of those in true sacs, and quite as difficult of recognition. (Fig. 15.)

What is termed "*incarcerated calculus*" has occasioned extreme embarrassment to surgeons. In Dr. Eve's late work (*A Collection of Remarkable Cases in Surgery*, Philadelphia, 1857), the single instance which occurred to M. Roux, of Paris, is given, and is of great interest, and valuable in a diagnostic and practical point of view. Lithotomy, by the lateral operation, was performed, but no stone found, although on sounding it was considered indubitable that one existed. Roux believed that it was lodged in the ureter, and proposed to operate a second time, above the pubes. We have no account of this having been done. The first operation was detailed in the *Lancet*, vol. i., in 1848.

In Dr. Eve's volume, several other interesting instances are referred to; we quote the paragraphs containing these.

"Although the cysts of incarcerated calculi generally form in the lower part of the bladder, stones have been known (Boyer) to get surrounded by a fold of mucous membrane under the symphysis pubis, and a case is mentioned by Lapeyronie, where the aperture of the cell containing the stone was quite hidden by a sort of membranous curtain entirely covering it. Meckel found, at a *post-mortem* examination, all the coats of the upper part of the bladder grasping an enormous calculus, which was, in some degree, suspended. Ledran and Deschamps have recorded similar cases. B. Bell and Louis Leblanc mention patients in whom the bladder, contracting upon a stone, has entirely surrounded it, and thereby turned the organ into a bag composed of two cavities. Verdier also relates that Bordenave, wishing to practise lithotomy upon the subject, introduced a stone into the bladder, as usual, by an incision above the pubes. This same calculus could, however, not be found when the organ was entered by the perinæal wound, and the bladder being then examined, it was found divided into two cavities, communicating with each other by a very small aperture. But as M. Begin remarks, in the *Dictionnaire de Médecine*, the calculus may also, in following the oblique direction of the ureter, glide between the mucous and muscular membranes, and there go on increasing in size. Thus Ledran felt distinctly a stone impacted in the aperture of the ureter, and could not extract it at the time, though he succeeded a couple of months afterwards, when the incarcerating membrane had partially given way by inflammation." (*Op. cit.*, pp. 776, 777.)

Another short selection from the same work (p. 777) is apposite in this connection.

"Case X. (*Miscellaneous Cases.*) *Partially Encysted Calculi.*—Mr. Duke related a case in which, although there was every evidence of a stone before the operation, yet, at the time of the operation, it was impossible to find it. On *post-mortem* examination, there was found a sort of mammillary projection from the surface of the bladder, which, when that organ was full, stood erect, and allowed the stone to be felt with the sound; but, when the bladder was emptied, this projection collapsed, and was entirely covered, as in a sac; four calculi, which were found, were thus perfectly concealed."

Other curious and valuable analogous instances are reported by Dr. Eve amongst his "remarkable cases."

Certain symptoms of anomalous nature may be mistaken for stone. A remarkable case was reported by Mr. Fenwick (*Lancet*, January 24th, 1846), in which aneurism of the abdominal aorta caused every symptom of vesical calculus; more surprising still, there was nothing indicative of aneurism, which was not discovered till after death, which it rapidly induced.¹

In the *Lancet* (1855), Mr. Coulson relates two cases of impaction of calculi in the urethra, in children. In the first instance, the stone was lodged near the vesical neck, and blocked the urethra completely; there was great distress; retention of urine, &c. The stone was fortunately extracted, and was of the size of a filbert. In the second patient the calculus was half way between the glans penis and the bladder; it was withdrawn by forceps. The writer remarks the frequency of stone in children;² the great irritability of the bladder in them; the extreme dilatability of its neck; and the fact that, as a general rule, the external incision heals kindly. Velpeau says that *one-third* of calculous patients are children.

It is important to remember that calculi may be detected at the first sounding, but *never afterwards*. An instance of this is related by Mr. Nourse, where nine calculi, contained in six separate cysts, existed.³ In a singular case related by Müller, the prostate gland "was converted into an immense pouch," into which the catheter passed, not reaching the cavity of the bladder, in which latter was a stone, detected only on the third sounding. Lithotomy was done, but no calculus found; a large quantity of pus escaped. On *post-mortem* examination, close contraction of the bladder around a con-

¹ No stone was found, and there was no disease in any of the urinary organs.

² In females, stone at any rate is rare; particularly so in female children. See Appendix, Note L.

³ Quoted by Coulson.

cretion of the size of a lemon, was discovered, and the above condition of the prostate.¹ These instances illustrate the occasional obscurity in which diagnosis is involved.

It is not without advantage that certain accidents, the results of which may long delay their appearance, are remembered. Most frequently, however, they are totally forgotten, after the more immediate consequences have passed away. Mr. Simon had a patient at St. Thomas' Hospital, a boy five or six years old, upon whom he performed lithotomy. Introducing his finger into the bladder after the operation, something unusual was perceived near its fundus, which, on removal, was found to be one-half of a needle; the other half was discovered *in the calculus*, and doubtless had served as the nucleus for its formation.² On inquiry, one of the family remembered that a needle had been violently pushed into the child's rectum while some one was "dancing it" on the knee; and thence it must have entered the bladder.

Calculi have been discovered formed upon a thread, introduced into the bladder in some manner. This is alluded to in a late number of the *Medico-Chirurgical Transactions*.

Dr. R. D. Mussey, of Cincinnati, has reported a case wherein a leather shoe-string, introduced into the urethra and escaping into the bladder, became the nucleus for a calculus shaped like a lumbricus.

Calculi of very soft texture (friable) may sometimes be crushed by the finger passed into the rectum, the other hand being held over the vesical region. This procedure is detailed by M. Dénamiel, and may, in rare instances, prove both diagnostically and remedially available.

*Calculi in Unusual Situations.*³—They have been found in the uterus (Hippocrates, *De Morb. Pop.*); Ramazzini thought such might have passed from the urethra into the womb (Coulson); in the vesiculæ seminales (Valentine); and Vegetius has mentioned the rectum as an occasional locality. Instances of calculous deposit in the lungs, heart, bloodvessels and brain, are related; we have only referred to those more likely to be of wholly urinary origin.

¹ Quoted by Coulson.

² Coulson refers to a very similar case related by Cheselden; the nucleus was a needle; the patient a boy of five years. In a soldier's bladder, a bullet was the nucleus of a stone.

³ For accounts of calculi in unusual situations, and formed on uncommon nuclei, see Part II., Chapter V.; and Appendix, Note M.

CHAPTER VI.

DISEASES OF THE URETHRA.

THE affections of the urethra, considered merely as a urinary conduit, are chiefly *obstructions* by which the other urinary organs are also largely influenced. They are generally easily recognized. *Dilatations* of the canal, either partial or general, are rarer, readily diagnosticated, and of far less importance. Malformations are of serious consequence, but are not properly "diseases." Pressure by enlarged prostate¹ or other tumour developed near the urethra, may narrow its calibre, and so induce difficulty in urinating, but the lesions of its inner surface alone concern us.

I. STRICTURE.

Urethral stricture is either organic and permanent, spasmodic, or inflammatory. Amussat gives four varieties:—Bridle-stricture; valvular; that arising from chronic tumefaction of the mucous membrane; and the callous.²

A. *Organic, permanent Stricture.*—This follows chronic inflammation, and the canal is contracted and more dense in structure than is natural. The extent of induration may be but slight, like a thread or a cord across the passage; at other times, several inches of the latter become cartilaginous and gristly. When *fistule* form in these cases, external operation can alone remedy the difficulty. We have never forgotten the impression received in student-days, from witnessing a terrible case of this nature, the result of repeatedly neglected gonorrhœa in a sailor; the entire urethra, to the com-

¹ See Appendix, Note N.

² Stricture near the meatus urinarius is not uncommon; it may be congenital. (Henry Smith, Esq., *Association Medical Journal*, 1854.)

mencement of the scrotum, was involved, and a most serious operation successfully done by the late Dr. A. L. Peirson, of Salem, Massachusetts. Early detection of stricture enables the surgeon to prevent such a condition.

Intemperance and an unhealthy state of the urine are causative of this species of stricture. At first, there are frequent calls to urinate. A burning sensation in the perinæal region ensues after passing water, and a few drops linger in the canal and dribble away gradually. Next, the stream becomes distorted, forked, twisted; in certain cases radiating from the meatus. One patient told the writer in very plain, but expressive terms, that he "*pissed like a sun!*"

Great and long-continued effort is necessary in order to pass water in aggravated cases. After a while, the bladder becomes irritable and micturition more frequent. Spasm of the parts may come on, and complete retention follow. Mr. Druitt and others mention rigors. If the condition be not remedied, the health gradually fails; the urine is foetid and mucous; vesical and renal disease ensue. *Post-mortem*, the prostate is often found ulcerated—also the urethra itself—with great dilatation behind the stricture.

Urethral bands and "bridle stricture" have long been recognized. Morgagni, Charles Bell, Goulard, Ducamp and others mention them. They are sometimes perceptible by the finger, outwardly; and the soft bougie frequently shows their form impressed upon it, when withdrawn from the urethra. They may increase in size and consistence, and become a serious obstacle to the passage of urine. *Valvular obstruction or stricture* is a more rare and curious form. The membrane is diaphragmatic in shape, inserted nearly around the canal, and pierced in some part.

Urinary abscess frequently follows old, neglected organic stricture. *Symptoms*.—Great increase of desire to micturate; severe rigors; hot skin; dry, brown tongue; weak, fluttering pulse; œdema of the scrotum (occasional). On examination of the perinæal region, a hard, painful, deep-seated swelling is perceived. Abscesses in the prostate gland, after acute inflammation of that organ, may open into the urethra. The symptoms of *prostatitis* will generally indicate the source of the purulent discharge; and if there has been previous pain in the urethra, it is likely to be transferred to the perinæal region, even before any pus appears.

B. Spasmodic Stricture.—The membranous portion of the urethra is surrounded by muscular fibres.¹ Spasmodic action may arise in these, when permanent stricture exists in some degree. Repeated attacks of gonorrhoea will induce this condition, especially if the patient be imprudent in diet or use acid liquors; if he is often exposed to wet and cold, or treated with cantharidal preparations. Hunter was one of the first to remark this sort of stricture. Certain French writers deny it a place in their enumeration of the varieties of stricture. Ollivier speaks of it, but thinks it should not be separately described. Amussat doubts if the fibres around the membranous portion of the urethra could actually close the canal by their contraction. Mercier, so late as 1844, was inclined to doubt the existence of spasmodic, *effectual*, stricture. English writers, of later date, however, describe this as a distinct form. It can hardly be termed a very common variety, and seems to depend upon causes acting less frequently than many others, upon the parts; there is no doubt of its occasional manifestation. An instance under our own observation, in which it followed long voluntary retention of the urine, was indisputable, and very marked; in less pronounced form, we have several times observed it.²

Phenomena.—The urine is completely retained, although there is usually very strong desire to pass it; the distended bladder is felt just above the pubes; there are feverishness, quick pulse and restlessness. The spasm relaxes occasionally and urine dribbles away; but the bladder, being unevacuated (if no remedy be effectual), will finally burst into the peritoneal cavity; or else the urethra gives way just behind the stricture, and extravasation of urine takes place. Prolonged retention, in any form of stricture, may cause rupture of the urethra, as well as of the bladder. Diagnosis is too late, unless fully established previously to such an extremity. The retention and hypogastric tumour should at once lead to catheterism; or, if that be impracticable, to more decided measures. The passing of a bougie, antispasmodically medicated, may not only be remedial, but, if so, diagnostic also, inasmuch as the nature of

¹ Particularly described by Mr. Guthrie.

² Mr. Hancock thinks the stricture from sympathetic irritation (*i. e.* spasmodic) is often caused by scybala in the bowels. He recently relieved a case which came under his care, by unloading the lower bowels of faecal accumulation. (*Association Medical Journal*, June 30, 1854.)

the stricture would be revealed. The sound may penetrate *after a time*, although previous efforts have wholly failed.¹

C. Inflammatory Stricture.—This is defined to be a variety of the preceding. Perinæal pain and tenderness, often very acute, with fever and occasional spasm, are remarked.

Causes.—Abuse of injections; exposure to cold and wet, and intemperance, during acute gonorrhœa. Ollivier thinks that *all* strictures might be considered the results of inflammation, but he retains the term “organic.”

II. EXCRESCENCES.

A. Caruncular and Polypous Excrescences.—These are said, by many writers, to exist occasionally in the urethra. Hunter, Charles Bell, Sœmmering, Mercier, Vidal and Ricord declare their presence; Brunner, Petit, and Desault deny it.

B. Cellulo-vascular Prominences.—These occasionally show themselves at the meatus urinarius in females. They are generally pediculated, and bleed readily; they may be attached high up, but their free extremity is, in nearly every instance of the formation, visible. There is a degree of difficulty in urinating and a sense of burning or itching. M. Pétrequin says that fungous tumour of the meatus urinarius, in women, is not so rare as classic authors have stated. It is painful, of unequal surface, fleshy, spongy, red, of variable consistence, but generally so fragile that it is easily torn; it bleeds freely when handled, and repullulates with great activity when only partially destroyed.²

III. VARICOSE NARROWING OF THE URETHRA.

This condition is very rare. Ollivier seems to doubt whether it ever occurs; he had never observed any cases, but refers to the statement of Sœmmering, who had seen the affection and believed

¹ Civiale has often remarked spasmodic stricture; he notices its preference for the part of the canal which most feels the force of the generative act. He mentions an instance from irritation of a fragment of stone after lithotrity.

² Vascular tumour of the meatus urinarius is not infrequently *excessively painful*; although often very small, and sometimes not easily seen.

it often attributable to venereal excess. If this condition occur, may we not remark an analogy between it and varicoccele, sometimes ascribable to inveterate masturbatory?

In all the above forms of urethral narrowing, the sound or bougie is the only reliable means of diagnosis. The soft bougie has of late been much employed for the purpose of gaining an impression of the shape of the stricture, so that the proper measures may be taken to remove it by cauterization or otherwise.

IV. URETHRAL FISTULÆ.

These frequently result from neglected stricture, or from ulceration of a venereal nature, from without inwards, or *vice versâ*. If large, they are evident to the eye; if quite small, by compressing the glans penis with the fingers, and thus wholly or partially closing the meatus, the urine will escape by the unnatural opening, and thus disclose its site. (Bérard.)

If the fistula be *urethro-rectal*, the urine flows constantly; if *urethro-perineal*, only when micturition is attempted. *Urethro-vaginal* fistula may often be perceived by the finger in the vagina, or by means of a speculum perforated on one side, or furnished with a sliding blade.¹

V. PROLAPSUS OF THE URETHRAL MUCOUS MEMBRANE.—CANCER OF THE FEMALE URETHRA.—LESIONS OF THE VERU MONTANUM.

Prolapsus of the Urethral Mucous Membrane.—This accident may happen in females; a few cases are on record. Ollivier mentions those related by Sernin and Tavignot. An instance is reported in the *Gazette Médicale de Paris*, August, 1854, by M. Malago, who remarks upon the great rarity of the affection. Morgagni described three cases, observed in the dead body. The case by Malago was seen in a healthy servant woman, 50 years old, in whom the mucous lining of the urethra came down after violent straining at stool. She had often previously felt a burning sensation in the canal; at

¹ Civiale, who relates many cases, mentions that one fistula *may have many* orifices; they are sometimes not discovered during life; are "complete" when there is communication between the urethra or vesical neck and the integuments; when not so, they are "blind."

the time of the accident this heat increased, and was accompanied by pain which was referred to the meatus, where a swelling, nearly as large as a nut, was found, consisting of prolapsed mucous membrane. It was sore to the touch, and lancinating pains shot through it. The patient described a sensation as if the urine issued by a wrong passage. The membrane was everted at each miction, and required manual return. Excision alone was entirely successful; a bougie left in the canal, and cauterization, were alike useless. All surgeons prefer excision.

Cancerous Disease of the Female Urethra.—This is coincident with that of other neighbouring organs. A remarkable instance, in which the morbid condition was limited to the urethra and corresponding part of the vagina, is quoted from M. Riberi, of Turin, by M. Cazalis, in the *Gazette des Hôpitaux* (February, 1845), and is cited by Ollivier. Cure was effected by excision of the canal, without consequent incontinence of urine.

Lesions of the Veru Montanum.—This body may be enlarged so as to obstruct the urethra in some degree. Civiale quotes cases¹ illustrative of its becoming swollen and hardened. Seminal emission was rendered imperfect and slow in one instance, and in another wholly prevented² by the above change in the *veru*, in conjunction with several calculi, of the size of peas, blocking the ejaculatory conduits. Sir Everard Home saw the *veru montanum* partially covered by membranous exudation, the product of inflammatory action, and which closed the ejaculatory orifices. Inflammation and ulceration have been noticed by several authors. The above phenomena connected with seminal ejaculation, on coitus, seem very distinctive. Pain of the most severe and persistent nature is sometimes present. The whole system feels its effects, and the nervous portion thereof is peculiarly cognizant of them. Yet no *special* character can be assigned to this pain, and detection of its seat, during life, is exceedingly rare. By exclusion of other affections, and, occasionally, by exploration, we may succeed. The introduction of bougies capable of receiving impressions may, as in stricture, be sometimes of service. A silver sound, introduced as far as the *veru montanum*, may render its bulging

¹ From Nicolas de Blégné and Lapeyronie.

² Ollivier remarks the arrest of semen on ejaculation, in ordinary stricture; pain occurring, and, sometimes, blood following. He considers that such persons cannot impregnate.

more apparent. There is frequently great sensitiveness along the entire urethra, even to the extremity of the glans penis. Diagnosis is very difficult—often impossible.

We have thus passed in review the diagnostic elements peculiar to each affection of the urinary organs. When it is remembered that many large volumes have been written upon these diseases, and several, even, upon the separate ones, it will be evident that he who essays to gather within a few pages the choice treasures so widely diffused, must roam far and tarry long—and yet be only a gleaner in the rich field. Our course has been to linger amid the weightiest sheaves. They are the freshest, and of undoubted quality.

While preparing a digest of what is known relatively to the diagnosis of these important maladies, we have met with several practical illustrations of the truths we have endeavoured to present. Scarcely any department of our art has had so many zealous and distinguished cultivators. Discovery after discovery has gleamed along their path, and the minute investigation of pathological changes has only been rivalled by the judiciousness of treatment and the wonderful ingenuity displayed in the fabrication and use of instruments. No less industry has been manifested in the faithful study of the normal anatomy of the organs. The sagacity of the ancients was great, and has the respect of the present age for much accurate information, even diagnostically, which it accumulated under great disadvantages; the perseverance of the moderns, if it still continue like that of Bright, Christison, Bird, Prout, Johnson, Rayer, Civiale and a host of others, will yet more nearly complete the lofty structure they have so far advanced—when there will be less occasion than now, to say "*Multum adhuc restat operis, nullumque restabit.*"

PATHOLOGY AND TREATMENT.

"Consilio et Manu."

PART II.

PATHOLOGY AND TREATMENT.

CHAPTER I.

GENERAL CONSIDERATIONS.

THE term Pathology has a wide significance. It properly comprises whatever enlightens us upon the nature and phenomena of disease; its materials are to be gathered during life and after death; by familiarity with the constitutional peculiarities of patients when in ordinary health, as well as when ill. Their history, hereditary and personal; their habits; mental and bodily employments; their aspect and associations are all pathological elements. To these, the physician adds his deductions from healthy and morbid anatomy; physiological reasoning; comparisons between perfectly performed and deranged function; microscopical investigation, and the hints afforded by the action of remedies.

It is therefore evident that pathological knowledge is gradually acquired; our first treatment is often necessarily directed to the most urgent symptom, but all ulterior management properly rests upon a careful appreciation of morbid causes and effects. Not only is diagnosis thus established, but the question whether any, and what, treatment is required, can thus alone be answered.

This portion of our subject may be summarily stated as follows:—

First. What is the actual knowledge we possess as to the nature of the diseases of the urinary organs?

Secondly. What is their best treatment?

The first question may be both generally and specially considered. It is evident that urinary disorders are referrible to very various sources. Amongst many, the most striking are deviations from the normal anatomy and arrangement of the organs; heredi-

tary and accidental influences affecting their functions or the integrity of their tissue; transgressions of their physiological requirements; the habits of life and the degree of exposure; climate; the food and liquids taken.

Inflammation and degeneration of tissue hold a prominent place amongst diseases of the urinary organs; and demand both primitively, and for their sequelæ, a large share of our attention. They may occur spontaneously; and mechanical causes are extremely prolific in developing them. The obstruction of a ureter, by a calculus, is a familiar proof of the latter assertion. Inflammatory action, with resulting structural lesion, more or less profound, is excited; disorganization of the kidney often springing from the abnormal condition of its efferent canal.

While we can rarely define the actual *extent* of lesion, a very accurate estimate is often made of its *nature*. This province of diagnosis is a part of the pathological domain, whose area comprises the entire physiology of morbid bodily action.

The discovery of mal-position or abnormity of the urinary organs, if causative of uneasy sensations, at once enlightens the physician as to his method of procedure. Drugs cannot benefit a displaced kidney, but a well-adjusted bandage possibly may;¹ and as has been previously remarked, it is a satisfaction to be able to give the assurance that constitutional taint and serious disease are absent.

The affections of the urinary organs will now be separately examined, in reference to their nature and treatment.

Having already given the most important relations of the organs, no minute and detached anatomical description is here deemed necessary, because it is intended to embody, under each head, whatever essentially concerns the affection designated—anatomically, physiologically and pathologically. To this will be appended a summary of the treatment now considered the most available. More immediate proximity of facts and greater clearness of description will thus be attained.

¹ See Appendix, Note O; see also page 24, Part I.

CHAPTER II.

AFFECTIONS OF THE SUPRA-RENAL CAPSULES.

I. ANATOMICAL AND PHYSIOLOGICAL PECULIARITIES.

CERTAIN facts relative to the structure of these organs, and a consideration of the conjectures hazarded as to their functions, appropriately precede any notice of their pathological conditions. So little is known of their physiology, that their diseases have hitherto received but slight attention; and it is only lately that any symptoms have been referred to them. They have always been regarded as peculiarly contributing to the requirements of foetal life; being distinctly formed at the second month of embryonic existence, and then, larger and heavier than the kidneys. Between the third and fourth month,¹ they are equalled in bulk by the kidneys, and at birth are about a third less than those organs.² In the adult, they are small, yellowish, flattened bodies, surmounting the kidneys, and inclining inwards towards the vertebral column. The right is somewhat three-cornered in shape, the left semilunar. Connected by common areolar tissue with the kidneys, they appear bi-lobed; the right adheres to the under surface of the liver, the left touches the pancreas; both of them are in close relation with the crura of the diaphragm, opposite the tenth dorsal vertebra; and, by their inner border, with the great splanchnic nerve and semilunar ganglion. Histologists declare their near approach to the blood-vascular glands, in structure.³ They are composed of two substances, a cortical and medullary; the former, when torn, is of fibrous aspect, its colour varying from whitish-yellow or yellow, outwardly, to a brownish-yellow or brown, in its interior. The medullary substance, when normal, is of a grayish-white, with a

¹ "In the third month." (Meckel.)

² Wilson.

³ Kölliker.

tinge of red—and is of softer consistence than the outer portion.¹ When handled, the cortical layer is easily detached from the more central or medullary portion, and a cavity, frequently occupying the entire organ, is seen, “containing a dirty, pultaceous substance derived from the half-disintegrated brown layer of the cortex, mixed with blood, together with less altered medullary substance; which, however, in more rare instances, also becomes broken up.”² Ecker described as “gland-follicles” certain aggregations of compartments lodging a granular substance, mixed with nuclei and cells; but Kölliker has found true follicles only in the inner portions of the cortex, in the form of round or oval vesicles; he names them “cortical cylinders.” In the cortical cells, fine, granular, nitrogenous matter is found, accompanied by solitary fat-granules, sometimes sufficiently abundant to fill the cells and simulate the appearance of a fatty liver. Pale cells, with fine, granular contents, now and then holding fat or pigment-granules, are seen in a fine network of connective tissue pertaining to the medullary substance; and these are said to bear a certain resemblance to the nerve-cells of the central organs; they often have a distinct *nucleus* with large *nucleoli*.

The *bloodvessels* of the supra-renal capsules are very numerous. No less than twenty small arteries enter their medullary substance or branch about their cortex; they are derived from the phrenic, cœliac, aortic and renal trunks. Their ramifications over the cortical portion are tortuous and multiplied. The veins are also numerous; they arise chiefly from the “rich capillary plexus,” as Kölliker terms it, in which the arteries terminate; join the vena supra-renal, which empties itself, on the right side, into the vena-cava, on the

¹ Frey, in Todd's *Cyclopædia of Anatomy*, has described the colour of the supra-renal bodies as yellowish-brown in the cortical, and reddish-brown in the medullary portion. The delicacy of the medulla and its vascular nature dispose it to decomposition, and cause the part to assume the appearance of a cavity, *post-mortem*. Dr. Wilks remarks, that the discrepancy between Frey and Kölliker, arises from the fact that both colours are met with; Kölliker's description he believes the normal one, and he thinks it ratified by the fact, that, in persons killed by accident, he has purposely examined the organs and found the medulla grayish-white; and in those affected with cardiac or pulmonary obstruction, or in persons long dead, the centre has been red and soft. This does not fully account for the different appearances, and it remains to be determined whether they are due to disease, old age, or *post-mortem* changes. Dr. W. believes the latter to be the case. (*London Medical Times and Gazette*, Dec. 29, 1855.)

² Kölliker.

left, into the renal vein. There are other smaller veins. It is thus evident that the circulation is abundant through these organs, and their proximity to the kidneys is therefore not unimportant, especially in depraved states of the blood. Kölliker has noticed *lymphatics* only on the surface of the supra-renal bodies, and in small numbers. Others describe them as large and very numerous. Both Bergmann and Kölliker assert the abundance of nerves going to the capsules; they spring from the semilunar ganglion and the renal plexus, whose proximity has been mentioned. To some extent, they are derived from the *vagus* and *phrenic* nerves.¹ Kölliker² remarks that the functions of the bodies, in the absence of all physiological indications, and with the imperfect knowledge now possessed of the course of their nerves, can only be *generally* discussed. He regards the cortical and medullary portions as "physiologically distinct." The former may be ranked, "provisionally," with the "blood-vascular glands," and a relation to secretion attributed to it; whilst the latter must be considered as an apparatus pertaining to the nervous system.

The editors of Kölliker's work refer to Leydig's researches in 1853, which satisfactorily show the identity of the supra-renal glands of mammalia with the yellow, vascular bodies seated either on the kidney itself and its emulgent veins, or on the veins near the epididymis and ovaries, or upon the sympathetic nerve. From this analogy, and from the asserted gradual transformation of these yellow ganglion-globules into the fatty, granular cells of the *suprarenæ*, the correctness of Bergmann's belief is argued, viz: that the latter "have a close relation with the nervous system, and that they bear the same relation to the ganglia of the sympathetic nerves, as the pituitary body does to the brain." (*Loc. cit.*) Leydig believes, however, that notwithstanding their vascularity, they "must be removed from the category of the so-termed blood-vascular glands; which would then include only the thyroid and thymus, or should probably be abolished altogether, as an unmeaning term."

Bergmann's views seem to find a degree of support from the fact that the supra-renal bodies, with only a few exceptions, have been found exceedingly small in the *acephalous fœtus*, and in certain monsters besides, where the nervous system is particularly wanting, or diminished in development. Several specimens illustrative of this fact are preserved in the cabinet of the "Boston Society for

¹ Bergmann.

² Human Histology, Sydenham Soc. Edit., vol. ii. p. 219.

Medical Improvement." (Vide *Catalogue*.)¹ *Specimens* 766, 774, 776, 781, 783, 789, 793, 795, 807. Dr. Jackson observes, under specimens 766, 774, that in every case of "acephalous foetus," the supra-renal capsules were very small, and in some they might readily have been dissected away with the fat which was found about the kidneys, as probably happened in some of the published cases, in which they are stated to have been wanting." He adds that Mr. Hewson noticed this general fact in 1775, and that it seems now to be acknowledged, although not alluded to by M. Saint Hilaire.

II. PATHOLOGICAL OBSERVATIONS.

The supra-renal capsules are wholly independent of the kidneys, as is proved by the fact that they are generally found when one of the latter organs is absent. (Meckel.) They are occasionally wanting, and especially when there is a deficiency in other organs. An instance, however, is given (Specimen 802, Cabinet of the Boston Society for Medical Improvement) where both kidneys were wanting, but the capsules present; there are several of one. In very rare cases, a congenital union is observed; one tunica albuginea investing both the kidney and capsule, and short, tense, vascular bands connecting the capsule to the kidney. (Rokitansky.) Accessory renal capsules are frequent; their situation is in the renal and solar plexus, and on the ganglion of the latter. They are of variable size; from that of a millet-seed to that of a pea; of a flattened shape; sometimes very large, occasionally quite small. Either of these states may be congenital, or the result of disease. In old age, the capsules become shrivelled; their cortex tough and coriaceous, their medulla obliterated; a friable condition of the latter is sometimes noticed; its colour varying from a dirty yellow to a rusty brown, resembling the spleen of old persons. This atrophied state may be referrible to induration and obliteration consequent on inflammation. (Rokitansky.²) It may be asked why should we not have the "bronzed" skin in such cases?

When the kidneys are displaced, the renal capsules do not follow them, but retain their natural position. Certain unimportant changes

¹ A Descriptive Catalogue of the Anatomical Museum, &c. &c., by J. B. S. Jackson, M. D., 1847.

² Pathological Anatomy, Syd. Soc. Ed., vol. ii. p. 245.

of form are observed in them. Rokitansky says they are never *fused*, as the kidneys sometimes are; we find, however, in specimen 762, of the Medical Improvement Museum, the account stating that "the renal capsules were small and united across the spine like a horseshoe kidney;"¹ also, in specimen 789, we have another instance where they were "as large, in proportion to the size of the kidneys, as in a well-formed foetus, but were broadly and intimately united across the spine like a horseshoe kidney." We are also referred by the catalogue to a statement by Saint Hilaire, of a very remarkable fusion-freak; the testicles, kidneys and renal capsules being fused. At the time of this report no similar case was on record. It is somewhat remarkable, notwithstanding the rarity of the occurrence, that so extensive an observer as Rokitansky should never have seen the simple fusion.

III. SPECIAL LESIONS OF THE SUPRA-RENAL CAPSULES.

Hæmorrhage into the substance of these bodies is not uncommon; as might be inferred from the great vascularity of their medullary portion. The extravasated blood distends the capsule more or less, and is changed in its composition according to the lapse of time since its effusion. The cortical substance is found pale and atrophied, and finally becomes of fibrous consistence. Suppuration and induration, as results of inflammation, are observed. Andral found the capsules changed into "purulent pouches" in the new-born child and in the foetus. Adhesion to the kidneys is a frequent result from inflammatory action in the contiguous surfaces.

Tubercular and cancerous degeneration are often found in the supra-renal bodies; cancer being more often secondary than tubercle. The lymphatic glands are commonly affected in these cases. Baillie pronounced them to be subject to tuberculous enlargement² (scrofulous?). Tubercle, when found, is usually in large masses; it sometimes melts down into pus, and is found inclosed in a callous sac, or is changed into a chalky substance, surrounded by a fibroid tissue in which no trace of the healthy structure of the organ remains.³

¹ See Appendix, Note Q.

² Ancell, on Tuberculosis, Eng. ed., p. 310.

³ Rokitansky.

A case of intra-cerebral tumour is reported by Dr. E. R. Peaslee, in the *New York Medical Times*, March, 1856; in which both supra-renal capsules were thickened, hardened and enlarged, with tuberculous deposits; the kidneys both healthy. The patient was a coloured person, so that the bronzing of the skin now attracting so much attention, as a presumed sign of renal capsular disease, could not be remarked. The fact of coexistent cerebral disorder may be noticed in view of the prevalent idea of the physiological connection of the supra-renal bodies with the nervous system. Cancerous disease of the organs would in this case have been more naturally expected.

Medullary carcinoma is the most usual form of cancer observed in the renal capsules, and the organs are greatly enlarged by the diseased deposit. By extension, or simultaneously, the neighbouring glands, and the kidneys, are affected. Hæmorrhage is prone to occur in the cancerous mass, and the latter breaks down into a "chocolate-coloured pulp."¹

Encysted disease and ossification have been observed in the supra-renal capsules. There are specimens illustrative of these forms of alteration in the Cabinet of the Boston Society, already referred to:—No. 595 shows ossification, which is referred to previous tubercular disease; specimens of this combination having been exhibited to the society. In the instance last referred to, the lungs and bronchial glands are noted as "perfectly healthy." (*Catalogue*.) Specimen 596 is "a large encysted tumour of the left renal capsule;" the patient was 40 years old, and died of erysipelas after the removal of a cancerous breast. A tumour in the left hypochondrium was noticed by her ten months before death; this was always painless; no special symptoms are mentioned; no discolouration of the skin (bronzing) is recorded. On dissection, the tumour was found closely adherent to the left kidney, which was healthy. The cyst was round; of the size of the two fists; of a dense, white, fibro-cellular structure. Within its cavity was "a soft, curdy substance, of a dirty grayish or brownish colour; also about ten ounces of watery fluid." The inner surface of the sac was smooth and regular for the most part, but now and then yellowish and coriaceous, with a few patches of white chalky deposit. The left extremity of the pancreas and a portion of the colon adhered to the tumour. No malignant disease in any of the organs.

¹ Rokitansky.

IV. BRONZING OF THE SKIN AS INDICATIVE OF DISEASE OF THE SUPRA-RENAL CAPSULES.

A new importance invests these organs, in consequence of the late elaborate researches of Dr. Thomas Addison, of London. In a beautifully illustrated quarto of forty-three pages, he gives the results of his hospital observation. To the eleven cases collected by him, Mr. Jonathan Hutchinson¹ has added others from various authorities, purporting to illustrate the views of Addison. According to the latter observer, the chief diagnostic mark of disease in the supra-renal capsules is "a peculiar browning or bronzing of the skin." This, it seems, may be present, whatever be the diseased condition of the capsules—as cancer, tubercle, or abscess—so that, as yet, we have only a *general* pathological clue, the new conditions being accepted.

A gradually increasing debility accompanies the colouration of the skin. There seems no obvious cause for this; and there is not that amount of emaciation which attaches to affections particularly characterized by debility. Death, it is said, is the almost invariable result in these cases; and it supervenes rapidly, as a general thing. In default of that degree of emaciation usually observed in tubercular and cancerous degeneration, we should be unlikely to suspect either, especially when there are no manifestations elsewhere of such disease. Although an evident cachexia exists, the symptoms are not sufficiently distinctive to enable us to pronounce upon the existence of either affection in the supra-renal bodies. The number of cases hitherto noted, although comparatively small, is yet too considerable not to be admitted as justifying, to a great extent, the conclusion that disease of the supra-renal capsules exists whenever the true "bronzed skin" is observed. If succeeding reports continue fully to confirm the deductions derived from the original ones, we may soon be in possession of a new pathological fact.

The aspect and history of a patient with "bronzed skin disease" may furnish more or less precise information respecting the character of the suspected lesion. If the scrofulous or tuberculous diathesis prevail, we may thus gain a hint; and the same is true of other constitutional peculiarities or affections, to which, perhaps,

¹ London Medical Times and Gazette.

the patient is hereditarily predisposed. Ignorant as we still are of the precise physiology of these organs, and divided as are the opinions of anatomists upon their healthy structure, their pathological conditions must long remain imperfectly understood. An extended series of observations is requisite before fully reliable conclusions can be formed. Since Dr. Addison's researches, it is stated that during the past two years, out of five hundred necroscopic examinations made at Guy's Hospital, under the observation of Drs. Wilks and Habershon, only two cases have been met with where the renal capsules were found diseased, in which the diagnosis was not made out during life. One of these failures was in a patient who died of cancerous disease, and, in him, "a dingy hue" of the face was noted.

It has been seen that Bergmann and Kölliker attribute to these organs a closer connection with the nervous system than Rokitansky and others allow.¹ Mr. Hutchinson remarks, that the very liberal supply of nerves received by the supra-renal organs leads to the conjecture that they are functionally very closely associated with the sympathetic system." The want of decided emaciation in the bronzed skin cases (there being rather a "flabbiness" of tissue, but a "bulkiness" of frame) hardly justifies a conclusion that they have any close relation with lesions of nutrition. Before any positive positions can be taken, many points remain to be determined. Amongst others, it should be ascertained how frequently the capsules are affected, without coexistent bronzing of the skin. Such cases have already been reported. In a case given by Dr. Bulkley (*N. Y. Med. Times and Gazette*, April, 1856), and which he now supposes similar to those related by Addison, the kidneys were normal in structure, although only about one-half the usual size. No examination of the renal capsules was made; but it is reasonable to infer their freedom from disease, because, had it been at all marked, it would probably have arrested attention, during the inspection of the kidneys. A more positive case is that recorded by Dr. Peacock (*London Med. Times and Gazette*, January, 1856), where bronzing of the skin, associated with great debility, was unaccompanied by any disease whatever, in either the supra-renal capsules or the kidneys. Softening of the *medulla oblongata*, and a calcareous deposit in its substance, sufficiently accounted for death.

¹ Kölliker counted thirty-three nerve-trunks entering a right supra-renal capsule.

The *Association Medical Journal* for January 26, 1856, has an account of a case of bronzing of the skin over the whole body, excepting the palms of the hands: all the viscera were found healthy, save that the gall-bladder was greatly distended; with obliteration of the *ductus communis*, the hepatic duct being pervious. The reporter of the case refers to four instances of "bronze discolouration" in very marked degree—the malady with which the patients suffered being styled "black jaundice."

As has been well remarked, some standard for the peculiar hue associated with renal capsular disease, must be adopted, or innumerable errors may be committed; various changes in the colour of the skin being confounded with the Addisonian bronze.

That "peculiar, brownish, earthy hue so well known to characterize advanced cases of malarial cachexia,"¹ and the alteration produced by the internal use of the nitrate of silver, are mentioned as possibly likely to mislead. The change arising from the latter source is but infrequently noticed,² and is hardly a bronzed, but rather a leaden colour.

The following facts are presented by Mr. Hutchinson as derived from an analysis of his reported cases: Out of twenty-seven cases of "bronzing" tabulated, both renal capsules were found destroyed by chronic disease in *twelve*; and in all these the peculiar colour of the skin was very marked, whilst the debility also existed, which is another characteristic of the affection. In seven cases where there was no *post-mortem* examination, presumptive evidence of the existence of lesion was very strong. In one patient (then living), the symptoms corresponded so closely to those observed in the cases ratified by necroscopy, that it was considered an undoubted instance of irremediable renal capsule disease. In another patient, both capsules were found affected with recent suppuration, but only "a yellowish-brown" tint was observed during life upon the skin; it was supposed that the disease had not lasted long enough to produce the deeper shade. In four cases of disease of one capsule, the bronzing, although decided, was much less marked than when both were affected; this fact is regarded as confirmatory of Dr. Addison's opinions. The intensity of discolouration has thus far been found

¹ Dr. Bulkley. (*Loc. cit.*)

² Within the past eight months, we have, however, seen five different persons wearing this livery—an unusual number, we believe, for so short a time.

to be in proportion to the amount of structural injury, and to the length of time it has existed. Out of twenty-eight cases (one having been reported since the construction of the table), twenty-five supply us with more or less positive evidence in favour of the new theory. In certain of the apparently "exceptional cases," an explanation of sufficient force may be offered. Thus, Mr. Hutchinson remarks that, in a case where recovery took place, the "dirty-brown tinge" of the skin disappeared. He argues that here no true pigmentary change had been established; the disease might have been of hepatic origin; the discolouration came on suddenly, whereas it is usually gradual in its accession, often requiring several months for its full development. In another instance, a few nodules of cancerous degeneration were found in both the supra-renal capsules; there had been no discolouration of the skin. Possibly, the very partial invasion of the disease may account for the non-production of the morbid hue, it being remembered that the depth of the latter has hitherto borne a strict relation to the amount of structural injury.¹

Case No. 21, from the table already referred to, is set down as perhaps more truly "exceptional" than any. This is the one reported by Dr. Peacock. A girl of fourteen years complained of lassitude, and had slight cough; the complexion was "muddy," of a brownish hue, observed to be deepest on the face, arms, and shoulders; there was no "mottling" of the skin, which, in the best marked cases, is very distinctive, the bronze *patches* having enabled

¹ The latest opinion is that the absence of the *melasma Addisonii* does not always indicate the absence of Addison's disease; it is probable that discolouration may often not take place until the affection of the capsules is far advanced. Dr. Addison is recently quoted (*Lancet*, February 27th, 1858) as saying: "In the instances which have fallen under my own observation, it appears to me quite conclusive that the amount of discolouration has been connected with the softening process, or liquefaction of the contents of the organs, the one being in direct ratio with the extent of the other." Yet the same discolouration has been remarked by Addison himself as "one of the earliest symptoms" of the diseased condition. Still he believed that the latter "might and did occur without any such discolouration." (*Loc. sup. cit.*)

Three cases of disease of the supra-renal capsules were under observation in Guy's Hospital at the above date. One patient, a female, was improving, the melasma being of a lighter colour than previously. There had been before, however, in her case, some amendment and subsequent relapse. Two of these cases exhibited very marked melasma; the third showed none whatever, but was considered a genuine case. One case was complicated with psoas abscess.

Dr. Addison in one instance to predict speedy dissolution when no other alarming symptoms existed. A chalky concretion was found in the spinal marrow, and, as doubts were expressed during life as to this being an example of true bronzed skin, it is fair to consider this case as not proving anything, and it should be thrown out of the category. The supra-renal capsules were reported free from disease.

Having thus assembled the testimony derived from this interesting series of cases, the following *résumé* of symptoms is subjoined, as tending to throw light upon the pathological conditions. The change of colour of the skin is mainly a diagnostic element; it awakens our suspicions, and thus far, when decided, has been indisputable. This pigmentary change has its places of election, and its peculiar forms. Beginning upon the parts most exposed to sun and friction, in irregular patches, it extends, and is more marked in certain localities than in others. The neck, the backs of the hands, the front aspect of the thighs, and the arms, are most frequently affected. Wherever pigment is naturally abundant, the colour is most marked; thus, around the nipple it is deep, while the palms of the hands and the matrices of the nails are nearly or quite unaffected. This tendency is regarded as confirmatory of the idea that the change is really a deposit of pigment. (Hutchinson.) The continuance of the pearly-white of the conjunctiva is differentially diagnostic with a jaundiced condition.

A very interesting case is reported in the *London Lancet* by R. H. Goolden, M. D. (September 12th, 1857), where no bronzing of the skin was observed, yet extensive disease of the supra-renal capsules was discovered *post-mortem*. The patient was a surgeon, forty-six years of age, and formerly a pupil of Dr. Bright, who, with Dr. Rees, saw him in consultation during this, his last illness. The most marked symptoms were extreme anæmia and gradual loss of strength. "The right rectus muscle was firmly contracted, giving the alarm of mischief below, and in contrast with the left, which was soft and yielding."

Every organ was found healthy except the capsules. "The body was extraordinarily anæmic. * * * The right supra-renal capsule presented the appearance of a large flaccid bag collapsed; the vein and the artery were seen entering the viscus. On opening it, there was presented a large cavity lined with chocolate-coloured, granular matter; no medullary substance, and the cuticle very thin

would be seriously impeded, and that the nervous system would be gravely affected, is another of this observer's deductions.¹

There are but few discolourations of the skin, arising from disease, with which the true bronzing could be confounded. The brownish hue caused by chronic jaundice is not likely to be mistaken for one which "strikingly resembles the colour of a bronzed statue from which the gloss has been rubbed off." Moreover, the *conjunctivæ* and ungual *matrices* would be coloured in the hepatic affection, but clear in the bronzed skin cases; the discolouration in the former would be diffused; one of the chief characteristics of the latter is the *patched* and *mottled* form it assumes. Browning from the sun's rays² is ineffectual upon parts protected by the clothing; the spots of *pityriasis versicolor* often have a great similarity to the bronzed skin; "their limitation to the abdomen and chest, their defined outline, their furfuraceous surface, the slight itching which attends them, their contagious character, and, above all, the microscopic examination of the cuticle," are sufficiently distinctive.

The muddy hue caused by certain *cachexiæ* is more equally diffused than the bronzing, and it seldom closely enough assimilates the latter to deceive. Mr. Hutchinson, however, thinks it just possible that in two of the tabulated cases this error may have been committed.

The excessive *debility* remarked is a very striking symptom. In connection with the nearly constant freedom from marked emaciation, it has a special value. There is an utter prostration of body and mind, and, often, death seems imminent from sheer exhaustion; there being no tendency to thoracic disease. This state of things is noticed, with but one or two exceptions, in all the cases recorded. Although never extreme, there has been, in the majority of instances, loss of flesh; but there is a *flabbiness*, rather than an actual wasting. Anæmia is nearly always remarked. The pallor of the unbronzed portions of the skin is extreme; the muscles are soft; the conjunctivæ pearly; the blood, examined microscopically in two cases, was found "loaded with white corpuscles." To this impoverishment of the blood, the weakness, breathlessness on effort, and feeble action of the heart are doubtless correctly attributed; as also may be the irritability of the stomach.³ The *pulse* has been characterized by "extreme softness and compressibility;" no increase of its frequency is noted. The *tongue* has not manifested

¹ See Appendix, Note P.

² *Ibid.*

³ Hutchinson.

other conditions than such as are usual in any illness where debility is the prominent symptom. Just before death, the stomach becomes very irritable; anorexia, nausea, vomiting, pain and sense of sinking at the epigastrium, are spoken of. The state commonly called "bilious" has been noticed. Costiveness is the rule; few patients have had diarrhoea. The *urine* has not, thus far, been found abnormal in any important degree. Lumbar pain was occasionally noticed, but in two such instances there was coexistent disease of the vertebrae, to which it might very properly be referred; and no reliable deductions can be drawn from its presence in the others. The cerebro-spinal functions were several times disturbed. Epileptiform convulsions in three persons; failure of memory, and remarkable change of temper, in one; and in another, numbness of the fingers, legs, and tip of the tongue, were some of the manifestations. One patient had *tic douloureux*.¹ At the Brighton Hospital, a peculiar odour was exhaled from the body in two cases; in one, for some weeks, in the other for a few days only, before death. This has not been observed in other cases, and cannot be considered distinctive.

Death has occurred chiefly by exhaustion; sometimes a peculiar collapse has preceded, for a while, the fatal event, without any assignable cause. Once this phenomenon was so sudden and extreme, that poisoning was suspected.

With reference to the theory of the disease, and implicating the function of the supra-renal bodies, Mr. Hutchinson remarks that, "supposing them to exercise a presiding influence over the functional efficiency of some of the viscera of the abdomen, it is easy to see how fatal lesions of health might ensue on their destruction. Dr. Gull has pointed out the close resemblance between the pineal gland and the supra-renal bodies, in minute anatomy, and also in liability to calcareous deposit; and the idea seems well to merit attention." (*Loc. cit.*, March 22d, 1856.)

V. NECROSCOPIC APPEARANCES.

The cases analyzed afford examples of varied morbid action. Acute and recent inflammation, terminating in abscess, was ob-

¹ The not infrequent disturbance of the nervous functions countenances the opinion that the supra-renal capsules are intimately related to the nervous system.

served in one instance. An atrophied condition, with concretions in the supra-renal bodies, of a fibro-calcareous nature, existed in seven cases. In certain of these, cysts were also found, and a fluid of purulent aspect filled them, bathing the concretions. "These changes probably result from inflammation of a chronic character." The capsules were usually entirely disorganized, and both of them involved in all the cases of this lesion recorded. In two instances the healthy tissue was totally lost in a sort of fibroid transformation, coupled with great enlargement and induration.

A deposit resembling *tubercle* was thrice observed, and the normal structure of the organs was lost. In two of these examples, the morbid product was found in both organs; in one, there were no tubercles in any of the other viscera.

It has been suggested that the deposit may be more nearly allied to some form of fibrinous effusion, the result of inflammation, than to true tubercle.¹ A case of nearly universal bronzing of the skin is reported in the *Gazette des Hôpitaux*, July 9th, 1857, from the records of "L'Hôtel Dieu de Lyons," by M. F. Leurat Perroton, Interne du Service. The supra-renal capsules were at least three times their normal size, and irregularly knobbed. Or ude *tuberculous* deposition affected them. The right kidney was displaced into the iliac fossa, but the capsule retained its usual situation. The patient was a female, and had been the subject of chloro-anæmia.

A remarkably complete and satisfactory case of tubercular disease of the supra-renal capsules, accompanied by bronzing of the skin, was lately reported by Dr. A. A. Gould, of Boston, to the Society for Medical Improvement. The account is printed amongst the transactions of the Society for May 25th, 1857. (*Boston Medical and Surgical Journal*, vol. lvi. pp. 480-1.) Nearly every symptom mentioned by Addison was present in this patient.

Cancer is reported in six out of twenty-eight cases. In all, it was *secondary*. In four, only one organ was involved; one case only showed total disorganization of both. With the exception of cancer, an unusual symmetry has been observed in the accession of disease of the supra-renal capsules, both organs being nearly always attacked.

¹ Hutchinson.

VI. PROGNOSIS.

Wholly unfavourable. When the bronzing of the skin is *decided*, there is little hope of recovery; not even temporary restoration has been observed.¹

VII. TREATMENT.

All treatment must be empirical; with our present imperfect knowledge of these affections, indications are alike vague and unsatisfactory. No ground is as yet afforded for any uniform course of remedial measures. Those who have had the best opportunities for observation are inclined to use those medicinal agents best suited to combat inflammation; believing that the structural changes are more or less due to action of that nature. To this end, a mild mercurial course has been suggested; and also, whilst supporting the patient by bland, but nutritious, food, the use of the iodide of potassium. A judicious administration of *tonics* will occur to the physician; the circumstances environing each case being his guide. It may also be mentioned that any detected tendency or previously manifested indication pointing to constitutional disease—such as tubercle, cancer, etc.—would call for unusual diligence in prosecuting the measures most available in those diatheses. The existence of such conditions, however, would give to any treatment the character of a “forlorn hope.” The remedies found useful in pure nervous excitement or exhaustion, and the avoidance of those labours, anxieties, or pleasures liable to induce either of these

¹ Dr. Todd has lately, however, had under his care, at King's College Hospital, a man of thirty-six years, whose skin presents every appearance of the bronzing described by Addison, and in whom amendment has taken place. At one time, the patient seemed to be rapidly sinking; he has presented all the evidences of marked anæmia. There is diminution of the blood-globules (“probably 50 parts in 1000”), and their margins are thrown into angles or serrated. The white corpuscles were found not to be increased. (*Lancet*, January 16th, 1858.)

The patient has latterly been improving both as to the constitutional symptoms and in respect of the discoloration of the skin; “the darkness of the peculiar bronze tint has become gradually less and less.” The reporter promises a continuation of his account, which may be looked for with interest, since recovery from this disease is almost never observed, and this bids fair to be an instance.

states, may be suggested, in view of the possible close relation between the renal capsules and the organic nervous system. How far any local applications, irritant or soothing, would be of any avail, is perhaps worthy of consideration. If congestion or inflammation were suspected, these means, with local depletion, would be appropriate.

CHAPTER III.

DISEASES OF THE KIDNEYS.

THE following affections are those peculiarly manifested by the kidneys; they may be clearly announced during life, or more rarely, only revealed *post-mortem*. Nephritis (Acute and Chronic Desquamative); Waxy Degeneration; Non-Desquamative Disease; Fatty Degeneration; Suppurative Nephritis; Nephritis from Retention of Urine; Pyelitis; Nephritis from Renal Calculi; Tubercular or Scrofulous Disease; Cancer; Hæmaturia.

GENERAL ANATOMICAL CONSIDERATIONS.

The situation and structure of the kidney have a certain amount of importance, relatively to its pathological conditions. We naturally infer its liability to be affected by its propinquity to diseased organs, such as the liver, spleen, intestines, etc., and, more rarely, external causes reach it, its sheltered position usually securing it from harm. Thus, abscess of the liver may be readily communicated to the right kidney,¹ and if the colon be diseased, extension of the affection to either organ is easy. There are, moreover, numerous examples of a converse action, and a renal abscess opening into the colon is an accident not very rare, yet of somewhat diffi-

¹ An interesting case is reported in the *London Lancet*, for October 10th, 1857, where abscess of the right kidney occurred consecutively to the same affection of the liver. The patient, after the free discharge of both abscesses, externally, was, at the date of the report, progressing favourably, and there was every prospect of his recovery. He was forty-five years old, thin and spare, of medium height, of temperate habits, and had suffered for several years with paroxysmal pain in the loins, especially upon the right side. There was also torpor of the liver, and a state bordering upon jaundice. Pus was finally discharged with the urine.

Iron and dandelion, internally, with opium and tartar-emetic plaster externally, were first used; quinine and nourishing diet were subsequently required.

It is presumable that the abscess in the kidney was formed by reason of its contiguity with the previously diseased liver.

cult diagnosis. The relations of the kidney are therefore highly important. In addition to those already mentioned, it should be remembered that the posterior surface of the kidney rests against the diaphragm, and upon the *quadratus lumborum* muscle, the tendon of the *transversalis*, only, being interposed; that it touches, also, the *psoas* muscle, and by consequence, is in close proximity to the ribs and spine. Whenever ulceration, abscess, or malignant disease affects these closely related parts, transmission to the kidney may always be feared, and we often have direct evidence of the fact.

The *special* structure of the organs is perhaps of even more importance than their general relations. Our first reflection is the vast amount of blood circulating through them, and the complicated, tortuous system of vessels demanded. It cannot greatly surprise us that disordered circulation and its consequences, constitute a large part of the pathological states observed. This will be evident when the individual affections are considered. The same fact explains the great sympathy manifested by the kidneys in any systemic trouble which renders the blood abnormal. It will suffice to mention, in this connection, that the renal or emulgent arteries are the largest given off by the abdominal aorta; that, by reason of their shortness, and of their transmission at about a right angle from the parent vessel, the wave of blood reaches the kidneys with nearly full force; it is then thrown by numerous branches throughout the organs, and into the supra-renal bodies. Cruveilhier remarks the enormous calibre of the renal arteries, and especially in respect to the comparatively small size of the organs themselves. He adds that it is not uncommon to see two of these vessels twisted one around the other. The renal veins are also very large.

Every part of the kidney is permeated by the blood. The arterial branches penetrate between the calices and the cones of the tubular substance; and at last, an arterial web is formed, whose largest meshes enfold the entire base of each of the pyramids, and ascend nearly to their apices.

Finally, nearly all the vessels go to the cortical substance, the tubular receiving only a few branches. Each lobule has independent vessels, and this explains their independence when diseased.¹ Two perfectly distinct systems of capillaries exist in the kidney; the blood traversing both in its passage from the arteries into the

¹ Cruveilhier.

veins. The first set, nearest the arteries, constitute the vascular tufts in the Malpighian bodies; the second, directly communicating with the veins, surround the convoluted tubes. The efferent vessels of the Malpighian bodies, which carry the blood between these two systems, may collectively be termed "the portal system of the kidney."¹ Mr. Bowman infers that the capillary tufts are specially acted on by diuretics; and that, from them, water, salts, etc., pass out of the system. They are also presumed to be the media of egress "for certain morbid products, as sugar, albumen, and for the red particles of the blood." Urea, lithic acid, etc., proximate constituents of the urine, are known to be derived from venous blood.

Nerves.—The kidneys derive their large supply of nerves from the renal plexus, which is formed by the lower and outer parts of the semilunar ganglion, the solar plexus, and the descending branches of the lesser splanchnic nerve, conjointly. The spermatic plexus receives branches from the renal, which also sends others along the ureters. This distribution well explains the morbid sympathies existing between the kidneys, ureters, and testicles; and, in another direction, with the stomach and diaphragm. These are the more intimate nerve-relations, with their resulting dependency of sensation, when one or other of the organs is affected by disease. But, if the latter be serious, pain referrible to renal disorder, or to affections of the ureters, might be far more remotely signified—so close is the connection of these organs with the great nerve-centres. The peculiar character of renal pain is referred by certain authors to the extensive ganglionic connection formed with the kidneys. The nausea and vomiting often accompanying the pain caused by renal concretions, are doubtless ascribable to the sympathetic relation thus established; and the existence of the calculi has frequently been first indicated by pain and swelling in one of the testicles.²

Following the above general considerations upon the healthy anatomy of the kidney, its pathological states will be similarly examined; and next, the individual diseases will be taken up in detail. To the investigation of their *special* pathology, many different agents contribute. Physiology is not without its instructive lessons, whilst the scalpel of the morbid anatomist, the precise tests of

¹ Bowman.

² Prout and others; now a well-known sign.

the chemist, and the sharpened vision of the microscopist, leave little unexamined, even if much remains to be explained.

PATHOLOGICAL ANATOMY; GENERAL CONSIDERATIONS.

The kidneys are *hyperæmic*, or *anæmic*, *hypertrophied* or *atrophied*, according to the nature of the morbid influences affecting them. They are softened or indurated; in a granular state; become degenerated, more or less, and sometimes totally so, by permeation of tubercular or fatty matter (in certain instances both coexisting in the same patient);¹ are converted into cysts; are sometimes ruptured by purulent or urinous accumulation within their pelves; are occasionally attacked by gangrene; become the seat of cartilaginous and osseous formations; are infiltrated with pus; affected with cancerous disease, most frequently of the cerebriform type. In addition, they are—although very rarely—a prey to entozoa, chiefly hydatids, and the strongylus gigas; melanotic, colloid, and gelatiniform matter is found in them; they are liable to calculous formations, and to very serious mischief arising from their presence. Cruveilhier remarked the existence of a yellowish-white substance, like jasper,² in small masses, scattered throughout the tissue of the organs, quite firm, but which, at first sight, might be mistaken for deposits of pus. He considered this as the proper substance of the kidney, indurated and deprived of its natural colour, after resorption of pus, which had been infiltrated in its midst. The lesion he considered one of restoration; analogous somewhat to the cicatrized spot, although not so far resumptive of its functions, if at all. Dalmas classes it as an accidental production, without defining its nature.

Finally, the kidney may become enormously dilated from various causes. This process may continue until the pouch thus formed gets excessively thin. Spontaneous rupture, although possible, has not, so far as we are aware, been recorded. The perforation of abscesses³ by continuous absorption, is well known. Rayer and others have referred inflammation of the mucous lining of the renal pelvis (*pyelitis*) to extreme dilatation. Calculi are sometimes found in these renal pouches; and they are most frequently filled with a serous fluid, or with mingled pus and urine, mucus, blood, or albumen.

¹ Bence Jones: Proceedings of the Pathological Society of London, 1848-9.

² "Jaspé."

³ *i. e.*, renal abscesses.

Disease may long and extensively exist in the kidneys, undetected; death from other causes, as from accident, has often revealed a state of things which nothing had disclosed during life, but which it is difficult to imagine could attain such intensity, unrecognized. Again, *slight* renal disturbance may induce symptoms at once painful and alarming. Very frequently, necroscopy in no degree explains their violence and persistence. With regard to hyperæmia, it presents nearly every shade of intensity. When extreme, the kidney is increased in bulk and weight, the latter being often doubled.¹ Marked congestion is observed, and small ecchymoses stud the softened cortical substance, more or less thickly, from extravasation by rupture of vessels. This congested condition pervades the cortex, medullary cones, and mucous lining of the pelvis and calices. Blood drips freely from an incision into such a kidney; if healthy when attacked, its investing capsule is easily peeled off; "a somewhat turbid, sanguineous fluid is contained in the injected calices and pelvis."² Effusions into the parenchyma sometimes occur, forming a sort of renal apoplexy. Hyperæmic states of the kidney are more frequent than anæmic. While their precise significance is not always easy to point out, it may be predicated that an intimate relation exists between them and inflammatory diseases of the kidneys. But affections of a different nature, as the asphyxiated state, and certain cardiac disorders, are also accompanied by hyperæmia of these organs. Various changes in the composition of the blood may cause hyperæmia, and the albuminous condition of the urine which has been so frequently observed in the above named cases, is referred, with much reason, to the engorged condition of the kidneys.

Anæmia of the kidneys is referrible to various sources; pressure upon the organs; compression or obstruction of the renal artery and similar causes produce it. It coexists with other affections, and often with a certain amount of induration and atrophy.³ It may depend on a *general* bloodlessness, but this is uncommon. A case of fatal anæmia following menorrhagia, where, although "the kidneys were small, the epithelium of the tubes was perfectly formed," is related by Jones and Sieveking.

Mr. Simon speaks of a peculiar atrophy of the epithelium, produced by atheromatous and fibrinous matter obstructing an arterial

¹ Jones and Sieveking, *Pathological Anatomy*.

² *Ibid.*

³ Dalmás.

branch, and thus causing "a *local* anæmia." The large, pale kidney frequently found in the second stage of renal degeneration, and by some considered as constituting that stage, is thought to owe its condition, partly, to pressure on the inter-tubular plexus.¹

Hypertrophy and atrophy, unassociated with actual disease, may be *general* or *partial*, and may pervade, together, a single kidney.

Sometimes the upper portion of one, or both, will be found atrophied or hypertrophied, and the converse may happen. The cortical substance is attacked at one time, the tubular at another. Instances occur where both the kidneys are affected with one or other of these conditions.

Softening and Induration.—Two distinct kinds of softening are found in the kidneys; in one, the tissue is friable, and this accompanies the hypertrophied, hyperæmic kidney. Dalmas styles it softening from inflammation. The other form—according to him much rarer—renders the organs flaccid; they resemble, somewhat, the pulmonary tissue; are not easily torn; do not break down; with diminished density, the molecular cohesion remains. This condition, when not connected with absolute disease, is imperfectly understood. Pure induration of renal tissue, apart from hypertrophy or atrophy, is very uncommon. As a result of compression, or of chronic inflammation, it is not infrequently observed.

Neither of these alterations, individually considered, is otherwise than *relatively* important; and the true condition of the part must be inferred or reasoned out from the etiological indications and the effects noticed. Softening is certainly a more serious change than induration. Whilst the former depends nearly always upon active inflammatory processes, and is connected with what is called the *hypinotic* state of the blood, the latter recognizes the fibrinous crasis, and, although diminishing the volume of parts, has a preservative influence upon their substance. Fatal disorder, therefore, is far more likely to follow softening than induration. The constitutional deterioration which often gives rise to softening of tissues, is, in itself, a powerful morbid element; and it should be remembered that not only healthy structures, but new formations, are attacked by the disorganizing force. The reciprocal action of a softened organic substance and of depraved blood upon each other, is easily appreciated.

¹ Jones and Sieveking.

Degenerations.—It is only quite lately that degenerations, as a class of diseases, have been recognized; they are now well understood, and authorities are generally agreed upon the essential points of their pathology. The greater frequency of fatty degeneration of the liver than of the kidney is remarked. The peculiar transformation and destruction of tissue observed in Bright's disease has commanded unusual attention, and opinions have greatly differed as to the amount of agency of pure nephritis in its origination. The views of Frerichs and Johnson, within a comparatively short period, are those most prominent.

Colouration of the Kidneys.—The different quantities of blood sent to the kidneys at various times, occasion corresponding dissimilarities of colour. They are also changed in this respect by the deposits made into their parenchyma. Pus, tubercle, melanosis, cancer, and other morbid products thus cause several shades of alteration. More general modifications arise from other causes; in jaundice, the kidney becomes very yellow. The latter fact is most striking in newly-born icteric children.¹

From the foregoing *résumé*, a general idea may be gained of the amount of injury, alteration and disorganization to which the kidneys are liable.

I. NEPHRITIS.

According as inflammation of the kidney is *idiopathic* or *traumatic*, both the diagnostic signs and the pathological changes somewhat vary. The acute form may become chronic, and the termination be by suppuration and entire destruction of the organ; or induration and atrophy may supervene. The traumatic cases, such as arise after wounds inflicted by penetrating instruments or missiles, and also those following the impaction of renal calculi, generally recover on removal of the immediate cause, unless the continuance of the foreign body be very prolonged, or the lesion by violence very extensive. Direct injury to the kidney, inflicted from without, is very rare; the action of renal calculus is more frequent; its intensity depends both upon the size and number, as well as the stay, of the offending bodies.

¹ Billard. Dalmás.

Idiopathic nephritis is pronounced rare by high authority. There are now certain well-described forms of the disease more or less easily recognizable by our diagnostic means,¹ and whose pathology continues to be studiously investigated. It is intended to examine each form successively.

A. ACUTE DESQUAMATIVE NEPHRITIS.

This form answers to that described by Dr. Prout under the title "Acute inflammation of the hæmotrophied kidney," and is the "Néphrite Simple" of the French writers. The present designation, employed by Dr. George Johnson, seems well chosen, since it derives its significance from appearances in the urine sufficiently characteristic of the disease. "The epithelial casts, with the scattered epithelium and blood-corpuscles, are indicative of a recent attack of acute desquamative nephritis."²

The gross and microscopic morbid appearances, the changes in the blood, with a reference of these to their causes, and the evident deductions, will best enable us to understand the nature of the affection.

Morbid Anatomy.—Both kidneys are very constantly attacked, and suffer very equally, as a rule. Their weight and bulk are increased, and so is their supply of blood; but the latter not uniformly so. Rayer has seen many very red, hard, and friable kidneys, when cut, exude but little blood, even on pressure. Generally, much more blood escapes than from a healthy kidney. Dr. Johnson remarks this irregularity, and states that "in some patches the capsular surface is quite pale, as if from a deposit of new materials, while in other parts the vessels are greatly gorged, their colour varying from a bright scarlet to a slate colour." The cortex is sometimes so pale as to be properly pronounced anæmic; and, again, every vessel seems full of blood. Rayer remarks the elevation of the red, and sometimes of the pale spots above the surrounding surface; where the latter is pale, the lobular divisions

¹ Nephritis is said to be sometimes *latent*, i. e., it arises and passes through all its stages without announcing itself by any of the signs usually attending it. This is analogous to the instances of latent pulmonary disease which have been reported. Dr. Watson noticed these cases, and Jones and Sieveking, referring to this, say that the inflammation, although acute, has thus an appearance of being chronic.

² Johnson, On Diseases of the Kidney, &c. &c. London, 1852.

are less defined, but are more marked and "coarser than natural in the congested parts."¹ Usually, the surface is smooth and the investing capsule easily peeled off. Spots of effused blood, frequently observed upon the surface, sometimes perfectly circular, at others irregularly shaped, are due to an extravasation of blood into the convoluted tubes; they were previously considered enlarged Malpighian bodies. When the organ is divided with the knife, the two portions, cortex and medulla, differ greatly in their aspect.² The former resembles the mottled capsule in appearance; there is alternate congestion and anæmia, and the blood-spots exist here also, sometimes running in lines or bands, and oftenest thus at the base of the cones. The organs usually remain firm in young people and adults; in older persons they tend to soften, as, in them, *all* glands do. Venous congestion renders the medullary cones dark-coloured, and the latter are compressed by the swollen portions of the cortical substance which pass out between them. The bases of the cones are spread out "like a wheaten sheaf."³ The mucous membrane of the renal pelvis is usually congested. This may extend into the ureter by continuity of surface. It may here be remarked that high authorities differ in respect to that condition of the kidney where there is hyperæmia with fibrinous exudation into the tubes. Frerichs believed this to be the first stage of Bright's disease, but Dr. Johnson considers it the result of acute desquamative nephritis. The characteristic indications of the existence of the disease are sufficiently marked. The very dark,

¹ Johnson, *On Diseases of the Kidney, &c. &c.* London, 1852.

² The cortical substance, says Rokitsansky, is that chiefly affected in acute renal inflammation. Hyperæmia and hypertrophy, with redness, and next "a uniform discolouration of the parenchyma," are observed, the hue being dark purple or dirty brown. The tissue is at one time swollen and hard, then sunken, flabby, and friable; it may be "turgid and friable;" a granular state sometimes follows, with a grayish-white or slate colour of the organs. The cortical substance suffers most; the tubuli may become involved, by propagation from the cortical or pelvic regions. The pyramids swell and become pale, ashen, dark-red, or rusty brown. When the lining membrane of the pelves and calices is affected, it has been compared, as to injection and changes of tissue, to catarrhal action. A flaky, dirty-coloured fluid is found in the above-named cavities in such cases. Suppuration is rare. The fascia propria and the adipose tunic may be involved in the inflammation of the parenchyma. Wherever the vascular effusions alluded to are seen, the fascia is easily detached, and its substance more or less swollen. The adipose layer is infiltrated with serum and softened.

³ Rayer, *Mal. des Reins*, vol. i. p. 20.

smoky-looking urine, depositing a reddish substance made up of blood-corpuscles simulating those of pus, and having, like them, compound nuclei, and the scantiness of this urine, which is albuminous to a high degree, are distinctive signs never wanting. Recovery frequently occurs; and when the disease proves fatal, the hyperæmia, which there is every reason to suppose exists at first, is not likely to be noted, because, as the disease advances, either hæmorrhagic effusion or remedial measures change the condition of things, and the urine returns to its normal quantity, colour, and constitution. Whenever the tube-casts grow paler, and uric acid, with occasional oxalate of lime crystals, appears in the urine, a favourable opinion may be formed. Jones and Sieveking do not regard the connection between acute desquamative nephritis and degenerative disease of the kidney as any closer than that between an attack of bronchitis and phthisis that might follow it, and many do not go so far even. Regarding the frequent recoveries from the nephritic affection, it seems unwarrantable to predicate destructive disease as necessarily following it.

The distinction drawn by Johnson, is that inflammation consists of three states—acute, chronic, and congestive or adynamic. The latter may follow the acute, but oftenest occurs in unhealthy subjects, or, in his own words, it “succeeds to the chronic inflammation of degenerated structures.” (*Loc. cit.*, p. 127.) He believes the opinion of many writers on the European continent, that inflammation is the only cause of organic disease, should be repudiated; and, indeed, it seems evident enough that degenerative disease may exist, to a great extent, even, without any inflammation. We may, then, with Dr. Prout, adopt the term “structural degeneration” as a fitting one for such states of the kidneys, they being “quiescent,” properly speaking. Thus it is inaccurate to consider an active nephritic condition, with shedding of tube-casts, a first stage in degenerative disease of the organs.

In fatal cases of acute desquamative nephritis, the bladder is almost always found empty; it sometimes contains a little, very albuminous urine; the analysis of the latter confirms the investigations during life. The vesical mucous membrane is more or less deeply and extensively congested. The liver is occasionally enlarged; seemingly from recent interstitial deposit. (Johnson.) The lungs are usually filled with frothy, and sometimes bloody serum, and various degrees of hepatization, and even carnification

are remarked. The brain presents but little noticeable change of structure in this disease, even when there have been decided cerebral symptoms; so serious, even, as coma and convulsions. The amount of sub-arachnoid and intra-ventricular fluid is sometimes increased; congestion is observed; very rarely lymph or pus; frequently no morbid change, whatever, is detected. Rayet states that inflammation of the *renal vessels* is nearly always independent of that of the renal substance.

Changes in the Blood.—First the proportions of its constituents are changed; the albumen is lessened, and the serum of less density. Dr. Bostock first remarked the latter fact. The density of the serum at the highest, is rated at 1.022 (Christison); it is often at or below 1.020. The more albuminous the urine, the less is this density; and this is referred to the escape of serum through the kidneys. Christison states the diminution in the solid constituents of the serum as from 100 or 102 to 68, 64, or even 61, in the 1000 parts. Both the albuminous and saline contents are reduced.

Sometimes there is an excess of fibrin; this is more likely when consecutive inflammation attacks any serous membranes.

The colouring matter of the blood, at first but little affected, finally decreases rapidly. There are, according to Christison, 1335 parts of hæmatosine in 10,000, on the average, in the male adult. Where bleeding has not been practised, he has even found it 1339; after bleeding or illness, 1111, 1046, and, in a boy who had been ill for two months, and largely bled, it was only 564. It is reasoned from these facts, that the decrease of hæmatosine is less rapid at first, than the pallid aspect of the patient would indicate.¹ To this pallor, the watery state of the blood may contribute; but in the latter stages of the malady, the decrease of the colouring matter is very great. *Urea* permeates the blood and occasions its well-known effects. It has been found in the various fluids poured out by diseased action, whether simply dropsical or inflammatory; and also in the milk of those suffering from renal disorders.²

Microscopical Examination.—This confirms the general evidence that the cortical substance is that chiefly affected. The interior of the convoluted tubes suffers most. They are filled with newly-formed epithelial cells, in various degrees—furnishing abundant proof of desquamative action in some parts, whilst little exists in

¹ Johnson.

² Johnson. Christison. Rees.

others. The most crowded tubes appear palest, generally, to the naked eye; they are anæmic-looking, and, as well as the epithelium, are opaque, and often granular. Frequently the coagulable constituents of the blood are added to the above named contents of the tubes; acetic acid clears this. When a portion of kidney thus affected is torn or scraped off, and microscopically examined, a far greater number of cells is found than in the healthy organ, similarly treated. On squeezing the tubular portions, their contents, in the precise form of the epithelial casts noticed during life, in the urine, may be observed. (Johnson) The spots of blood on the capsular surface "are composed of tubes filled with blood." (*Idem.*) Its colour is bright red if recently effused, but brown, or even yellow, if long there. In certain tubes *oil* is found; but usually not more than is often seen in kidneys pronounced healthy. The straight tubes of the medullary cones are often wholly normal; sometimes they are opaque, and filled with disintegrated cells. Their epithelial lining is generally found healthy or only shows the effects of irritation by an abnormal secretion.

Slight engorgement of the capillaries is the first morbid change remarked in the Malpighian bodies; the latter then "appear to the naked eye like bright red grains." In advanced stages of the disease, the urine being highly albuminous, most of the bodies present to the unassisted eye a lighter colour and "a less opaque appearance." Dr. Johnson figures them as microscopically seen.

They are described as seemingly bloodless, and covered with cellular-looking bodies, wholly or partially. Histologists pronounce the latter to be modified blood-corpuscles—modified by being viewed through thickened and opaque capillary walls, or possibly, in part, by some change in the corpuscles themselves; there having been a transudation of fibrinous or albuminous effusion. The surface of these small vessels often seems rough and granular—the granulations being very fine. This is, possibly, from coagulation of some material escaped through their walls. Organized effusion has been but rarely seen upon the latter or within the Malpighian capsule. These corpuscles are usually arranged linearly—forming a single line along the centre of the capillary canal. They are larger and of lighter colour than natural blood corpuscles, and frequently have "a dot in their centre."¹

¹ Johnson, *op. cit.*

Occasional rupture of the capillaries allows the escape of blood into the Malpighian capsule, forming an extravasation. The Malpighian bodies have not been found much enlarged or dilated.

A good view of the vascular system of the kidney, when affected with this disease, is obtainable by injection, and this process is more easy when the organs are thus affected; probably because the vessels are enlarged. Wherever the gorged tubes, before referred to, exist, indicated by exsanguine patches, the injection penetrates with difficulty. Dr. Johnson gives the preference to thin, uninjected sections, when the state of the bloodvessels is to be microscopically ascertained. He asserts the important fact that in acute nephritis all the vessels are pervious. The arteries are congested, but present no structural change in their walls. The Malpighian capillaries do not lose their transparency for some time; they are at first only congested or engorged. The subsequent thickening and opacity arise from transudation of serum through their coats, or from the coagulation of certain matters upon their surface. Hence the modification of the blood-corpuscles. Less blood is found in the intertubular capillaries than in the healthy kidney. Nor is any structural change commonly observed. The branches of the renal vein are usually found healthy, but coagula have been noticed in them.

Pathological Inferences. Nature of the Disease.—The beautiful adaptation of the various secreting gland-cells to their respective offices, whilst it may well enlist the zealous investigations of the physiologist, affords the pathologist the true explanation of the vital morbid processes and *post-mortem* changes which he observes. Some knowledge of these physiological laws is therefore important for the practical questions which at present engage us.

It is an admitted fact that different gland-cells are recognizable by a practised eye. For instance, a skilful observer will distinguish between hepatic and renal secreting-cells. The great mystery of their special endowment, so that one class secretes bile, another urine, etc., is as yet wholly inexplicable. It is established that a certain form of cell is associated with the performance of function in each gland or set of glands; and it should be remembered that the office of the kidney is "to separate" and eliminate the constituents of the urine. They are laboratories, in some sense. The convoluted tubes are the agents by which the solid constituents of the urine are secreted (as urea, uric acid, etc.), and the Malpighian

bodies furnish the large amount of water which characterizes the secretion.¹ Their peculiar office is manifested while sugar is passing through the kidneys in true diabetes; this substance being powerfully diuretic, directly excites the Malpighian bodies, and an immense quantity of fluid is poured out, in order to its solution and elimination.

The renal cells have the property of selecting certain materials from the blood, and extruding them through the gland-ducts subsequently. In healthy urine, no entire or even broken cells, or renal epithelial *débris*, are seen. The tissues being integral, nothing departs, during the performance of function, but the urinary secretion itself. It is only when disease exists (and this is the best evidence of it) that any renal epithelium is visible in the urine. The straight tubes of the medullary cones are regarded as "merely ducts for the transmission of the secreted products from the convoluted tubes into the pelvis of the kidney."²

We are now prepared to appreciate the evidences derived from the examination of the urine in acute desquamative nephritis, as well as the results of the disease which are revealed by necroscopy. While the facts observed during life are essential and singularly conclusive, the true character of the morbid process is clearly shown after death, and the diagnostic rules framed by the best observers are remarkably confirmed.

Dr. Johnson lays down the following "as a certain truth," essential to the complete understanding of the pathology of this disease "*All changes of structure commence in the secreting cells of the gland and are the result of an effort made by the cells to eliminate from the blood some abnormal products—some materials which do not naturally enter into the composition of the renal secretion.*"

Whenever, then, any such materials are in the blood, healthy renal function is directly interfered with, and whatever be the source of the poison, its effect is much the same. If in healthy urine we find no gland-cells thrown off, no tube-casts, no renal *débris*, we may take instant alarm when these are perceived; for, whilst it is possible that offending material may, for a time, be eliminated without injury enough to cause desquamative or nephritic signs, it is almost certain that there is some action upon the secreting cells and so soon as they begin to declare it for themselves, we may be sure there is sufficient reason. In jaundice, it is well known how

¹ Bowman.

² Johnson, *et alii*.

deeply the urine becomes tinged with bile. Here, a desquamative action is finally set up in the renal cells, from the action of the foreign secretion upon them. The tubes have sometimes been found filled with cells coloured by bile. The eliminative force employed has acted upon the gland-structure. There are many instances, however, where the offending material cannot be thus readily detected, but it may be considered certain, when desquamation is constantly observed, that there is some agent in the blood which is deleterious. Unfortunately, too, a reciprocal action is nearly always established, and unless prompt measures are adopted, the mischief will grow apace. Nearly every cause of renal disease acts injuriously upon the blood; consequently, we have double danger to encounter. Whatever vital process is performed under difficulties must react on the organs by which it is set up. If scarlatinal poison, cold, dampness, or intemperance, be the cause of disorder, the kidneys will show themselves morbidly active, by the appearances in the urine. Thus diagnosis is assisted, treatment early called for, and the patient under these circumstances has a fair chance.

As a result of desquamative action, we next encounter a formidable difficulty. The process interferes with prompt secretion, by blocking the tubes and so placing a portion of them *hors de combat*; hence a serious check to an important function.

Cell-growth, as well as secretion, is retarded, if not wholly stopped, in these obstructed tubes. The resulting injury must be apparent. Circulation is at first modified, impeded, and then arrested in some parts. Hence follows, if the acute disease is not cut short by treatment—or fatal—a chronic affection, to be described hereafter.

Distension of the Malpighian capillaries and of the arteries follows on the impeded circulation; the intertubular capillaries being first affected. Serum and fibrinous materials exude freely from these gorged vessels, and, together with epithelial cells, form the epithelial *casts* observed in the urine. The latter becomes albuminous, from the effused serum, and the coats of the capillaries begin to assume the opaque appearance already noted. When these vessels are greatly distended, they may break, and pour out their contents into the tubes. Blood-corpuscles will then be visible, entangled in the tube-casts, and also sometimes appear isolated in the urine, contributing to form the dark-red sediment spoken of.

The characteristic appearances of the urine are the same, whatever may have caused the acute nephritic attack; a very available fact for the practitioner. A secondary influence upon the kidneys is observed, referred to the action of the morbid urine, which, by

Fig. 16.



Drawing of red deposit from urine in intense renal hyperæmia.

reason of the increased irritability of the organs, is much more frequently passed. To this cause is very plausibly ascribed the existence of the congested patches, noticed on the mucous lining membrane of the renal pelvis, the ureters, and bladder.

The heightened vascular action and the subsequent stagnation or actual suspension of the circulation in some portions of the kidney, react on the general capillary system. The disturbance of the secreting function, rendering the urine scanty and throwing its constituents upon the tide of the blood, sufficiently explains the febrile action, the effusion of serum, constituting dropsy, the concomitant inflammations, doubtless often a direct consequence of the original disorder in the kidneys, and the cerebral disturbances. So important is the integrity of renal function and structure; for the kidneys are the great "depurators of the blood."

Acute desquamative nephritis may then be considered as the expression of an effort by the kidneys to eliminate morbid matter from the blood, however introduced, accompanied by a degree of vascular congestion and consequent inflammatory disturbance sufficient to induce more or less change of tissue, its slightest expression being limited desquamation. A typical form of the action is

that occurring after scarlatina. The cases following Asiatic cholera are exceedingly rapid in their course; a few hours only sufficing to terminate life.¹

Prognosis.—This is far from being unpromising in most cases. Although recovery may be protracted, yet most patients get well. Nephritis which attacks both kidneys is by common consent more serious than when a single organ is affected. This we should expect, and there is much analogical evidence in its favour. Thus double pneumonia is almost necessarily fatal. The causes will largely influence the practitioner's opinion. If dangerous complications exist, as, for instance, choleraic disease, or if the patient's constitution be feeble or broken down by excesses; if his privations be extreme, and exposure to cold and wet be, as it frequently is, a necessity of his life; if there have been previous exhausting disease, and mental perplexity be superadded, there are fearful odds to contend against; and a second attack is more likely than when non-specific causes are the agents. In such circumstances, the best medical care must often fail of success, and frequently no encouragement can be afforded. A favourable opinion may of course be given under the opposite conditions. The disease itself tends to a happy result, and Dr. Johnson asserts that a hopeful prognosis may oftener be given "in such a case than in any other form of renal disease." It may be borne in mind that the disease increases in frequency in proportion to advancing years. It is very infrequent in infancy, but exceedingly common in old age. It would therefore occasion us more apprehension if serious nephritis were to attack an infant. The feebleness of old age, too, is an unfavourable element in prognosis. The danger at the beginning of the disease consists in the impregnation of the blood by the urea and other constituents of the urine, and the consequent risk of cerebral disturbance, inflammation of the serous membranes, or of the viscera. Although the patient is more imperilled by these consecutive accidents, he must by no means be deemed in a desperate condition. Thus two cases of recovery are given, by Johnson, from severe convulsive attacks consequent upon renal disease, and which he terms "*renal epilepsy*," one in an adult, and another in a child.

Special Indications of Convalescence.—The first promising indication is an increase in the quantity of urine. Next, desquamation

¹ Johnson.

is observed to lessen and finally to cease; there is every sign that the renal circulation is relieved; soon, no albumen is found in the urine; dropsical effusions diminish and disappear; the colour and flesh get progressively better, and the strength returns. The great increase of urine is a powerful natural adjuvant to the cure, and must be regarded as a very favourable sign. Whether it is considered somewhat in the light of a crisis or as dependent on the direct diuretic agency of the urea, and other solid urinary constituents, which, long accumulated, finally get free passage and influence, its action is undoubtedly most healthful. It is a sort of sanatory flow, cleansing the tubes and washing away much offending material, which, if it remained, would only be a permanent agent in continuing disease. Johnson terms it a "flushing process," a reflex action, analogous to the rush of tears over the eye in obedience to the stimulus of a foreign body on the conjunctiva. The desquamated epithelium is the exciting force applied to the Malpighian bodies.

Duration of the Disease; Previous Health, etc., as prognostic elements.—Early detection and treatment of the disease, and previous good health offer fair hopes of recovery. Long neglect of the case, and tainted or abused constitutions are unpromising circumstances. A tendency to, or the previous existence of fatty degeneration, is exceedingly unfavourable. Very protracted cases have recovered; in one the urine showed albumen for nearly four months from the beginning of the attack.

Indications of Permanent Lesion.—Obstinate albuminuria with persistence of many of the other signs:—No patient can be pronounced cured, until the urine resumes its normal aspect, density, and composition. A case is related in which the affection lasted six months, with desquamation. The patient then improved, and the signs of renal disorder nearly ceased, when death from hæmorrhage upon the surface of the brain occurred. *Post-mortem*, no recent disease of the kidneys was found, but there was modification of the tube-structure, and its dilatation into cysts. This state of things would probably have given trouble at a later day, had the patient lived.

Liability of Recurrence.—This is believed to be very small if the poison of scarlatina or measles have been the originating cause.

In those rare instances where those diseases recur, there is more reason to apprehend a second nephritic attack; and an unfavourable

termination also. Fatty degeneration, or some other disorganization might follow. We must studiously guard against a return of dropsy which has supervened upon a first attack of acute desquamative nephritis; nothing is more unfavourable. *Erysipelas*, because a recurrent affection, is likely to be re-accompanied by a nephritis which has once been developed in connection with it; that which has caused, may cause again. If coexistent with *rheumatic fever*, nephritis will, for similar reasons, recur more readily than if typhus were the disease. Long-continued intemperance, repeated exposure to cold and wet, or constant anxiety, powerfully predispose to recurrence. In forming our prognosis, not only unavoidable influences, but the patient's amount of self-control, his exposures to temptation, and the care he chooses to take of his health, must be considered.

There are, of course, those who are inherently predisposed to attacks; in such, recurrence is greatly to be feared. "When an attack has been produced by a slight exposure to wet or cold, or by any apparently trifling cause, there will be a greater probability of a recurrence than when the exciting cause has been such, in its nature or degree, as few persons in perfect health could be expected to resist."

Here predisposition is inferred. Although a second attack is improbable, *the first being entirely cured*, yet its possibility must not be forgotten when we are called upon for an opinion on the re-established health. All serious deviation from health, whatever organs be especially implicated, renders a patient sensitive to outward impressions. Neither too full a sense of security nor undue anxiety must be inspired by the physician; lest the latter reproduce the evil, or the former lead to imprudences. It is believed that an individual once affected with renal disease, is more liable to feel the influence of all the other recognized causes, besides that which first acted. Thus, after nephritis following scarlet fever, exposure to cold and dampness is more potent to re-awaken the disease, than it would have been originally to cause it. The risk, however, is considered slight.

Complications greatly aggravate the patient's condition. Previous or concomitant affections of the associated organs render a case very serious. Uncombined renal disease is comparatively tractable.

¹ Johnson.

In acute nephritis *cerebral* symptoms accompanied by *ischuria* are invariably reckoned unfavourable. Dalmas states that he knew no instances of recovery after *typhoidal* symptoms had set in. Double, is infinitely more dangerous than single nephritis. Intermittent symptoms, with pernicious fever, suppression and putridity of the urine, are the grave phenomena mentioned by Rayer as accompanying double nephritis. Acute, supervening upon chronic nephritis, is an aggravated condition difficult of remedy.

Treatment. Preventive Measures.—Accurate etiological data supply us with preventive rules. Recurrence, at least, may often be avoided by strict observance of such regulations. In general terms, then, one of the physician's first duties is to *obviate the causes*. He warns the intemperate, the careless, and the wilful; all his tact is often demanded to decide when, and how much to interfere. In so far as any natural agencies and processes are curative, they are not to be meddled with. The question is a serious one, however, for when art is needed, the sooner it is applied the better.

Remedial Means.—The first object of treatment is to assist the kidneys in eliminating the morbid material thrown upon them. Whilst maintaining watchful care against the action of the originating and other causes, the other excretory organs must be called upon to aid the injured ones in their office. Treatment will be nearly uniform, whatever the cause, since the effects of morbid influences are almost identical, except in degree.

The patient should remain in bed, avoiding all exposure. In no disease, perhaps, is more benefit derived from the warmth and rest of the bed, if dysentery and kindred affections be excepted. Dr. Johnson remarks that whilst confinement to bed is absolutely necessary during the cold season, it is very desirable even in warm weather, and hastens recovery. The recumbent posture maintained, tends "to quiet and equalize the circulation;" and the uniform, mild temperature which should be kept up, has a beneficial action upon the skin.

Diet, Baths, etc.—Thirst may be gratified by bland drinks (water, barley-water, toast-water, etc.) in small quantities at a time. Solid food is unsafe, nor can it be borne; farinaceous articles are to be advised.

Under such management alone, many recoveries are reported. One of the most efficient remedial agents is *free action on the skin*. The hot-air bath is by some preferred to the warm-water bath. The

patient should take it in bed, and free perspiration should be encouraged; we thus directly relieve the kidneys. For children, the warm-water bath is preferable. No patient, especially a child, should be kept in a bath if faintness or marked dyspnoea occur. The sitz-bath is also advised, and mucilaginous materials are introduced into it with asserted advantage.

Antimonials aid the action of baths. The wine of antimony is most convenient, and is commonly given. Fifteen to thirty drops every 4 or 5 hours, is the dose for adults. In certain cases, a combination of Dover's powder and antimony is desirable. Care must be taken, however, that the bowels are free, that the urine is not uncommonly scanty, and that there are no cerebral symptoms. Opium in any form, with such conditions, is improper.¹

Purgatives.—Perhaps the most important adjuvant in relieving the kidneys is *purgation*. Spontaneous diarrhoea occasionally gives us a natural indication for treatment. Different amounts of action on the bowels are demanded. Cerebral disturbance, and a tendency to ascitic collection warrant more powerful purging than simpler cases authorize; indeed such action is often indispensable. Circumstances must guide us in the choice of purgatives; the difference of impressibility must be considered. Mercury is inadmissible in any case of renal disease, except its purgative action be ensured. Salivation is often unusually active, and readily produced by small doses. The compound extract of colocynth, compound jalap powder, the sulphate and carbonate of magnesia, are the best purgatives. The French use emollient clysters to keep the bowels open; and this is undoubtedly very often advisable, especially when scybala block the lower intestines. Not only is it important to remove these sources of irritation, but purgatives given by the mouth will act more easily and thoroughly.

Cases of ordinary intensity usually yield to the above measures. Should serious cerebral disturbance come on, indicated by pain in the head, delirium, convulsions, or coma, the urine growing very scanty, being loaded with albumen and tinged with blood, pain in the loins and back being superadded, prompt depletion is demanded. Bleeding from the arm may be tried; largely at first, afterwards *pro re nata*. Local bleeding will be found oftenest advisable.

¹ Dover's powder, *five grains*, with one-sixth or one-quarter of a grain of antimony; or a full dose of Dover's powder with one-sixth of a grain of antimony are the directions of Dr. Johnson.

English writers advocate cupping over the loins, believing that relief is thus obtained by the abstraction of a far less quantity than would be required from the arm. Repetition of the process is advised rather than large bleeding at one time. Venesection, with the English practitioners, is decidedly subordinate to local bleeding. Dr. Johnson speaks very strongly upon this point. He never saw a case in which he considered general bleeding required to relieve even urgent cerebral symptoms; and he thinks the renal regions preferable to either the neck or temples (or than leeching there) as the locality for cupping. Dalmas, Watson, and others favour local bleeding when ischuria, succeeded by vomiting and cerebral disorder, occurs. To these means may be added cold compresses to the forehead, and the swallowing of broken ice. Purgative enemata are by many daily persisted in; also saline draughts¹ and castor oil, which latter, if offensive to the patient, may be given by the rectum. Dr. Watson prefers the oil to any other purgative, if the stomach can bear it. Salines, he thinks, should be avoided on account of their irritative tendency.

Rayer advises large bleeding if pain in the renal region be very severe, and especially if vomiting accompany it, with abdominal tenderness and other peritonitic symptoms. Previously to the use of these means opiated poultices may be applied to the lumbar region, or chloroform upon spongio-piline, be locally tried. In many instances of severe neuralgic and other pain,² but especially in pleurodynia, the writer has found the last-named measure wholly successful. In deep femoral abscess, with constant severe pain, it once acted quite as satisfactorily. If even temporary relief be afforded, it is valuable.

A good reply has been made by Dr. Johnson to a possible objection to *any* bleeding (predicated on the deteriorated state of the blood) even if there be uræmic poisoning, viz., that if we can relieve the kidney by a moderate *local* bleeding, we thus more effectually prevent a waste of blood, than by neglecting to bleed and allowing the circulation to become more and more poisoned; for so long as the kidneys are unrelieved, so long morbid action increases, and consequently the blood progressively deteriorates.

Iced-water, or even ice in a bladder, to the shaven head when hot; also in severe convulsions, or in comatose states; and mode-

¹ Rayer.

² If all pain be not more or less neuralgic.

rate leeching or cupping about the temples, would be judicious treatment.

Counter-irritation, as well as soothing local applications, is of great service oftentimes; and not only near to the affected organs, with a derivative view, but in complications, as pleuritis or peritonitis. Great care must be taken not to use those agents which, when absorbed, have a special tendency to irritate the kidneys, such as cantharides and turpentine. Mustard and ammoniated liniment are appropriate.

The vomiting, often so troublesome in the early stage of acute nephritis, should be encouraged.¹ It is a sort of safety-valve for the escape of excrementitious matters until other channels can be opened.

Diuretics are to be avoided. If we stimulate the embarrassed, inflamed kidney, already over-worked, and with its tubes obstructed by shed epithelium, our interference obviously hinders, not assists, nature. In the early stages, these medicines are sure to aggravate the disease; and, later, they can subserve no good purpose, for, in favourable cases, at the close, a profuse flow of urine is usual. If, then, diuretics be given, they will either receive unmerited credit or do great mischief. Digitalis should be excepted from this restriction, as it is occasionally very useful.

Management of Convalescence.—Upon the appearance, and with the advance of the signs of recovery, mere medication should be slackened, and finally suspended; soothing appliances and aids to the efforts of nature being alone requisite. The bed must not be too soon abandoned, nor the use of baths (hot air, vapour, or water) relinquished. As in most maladies, much is gained by continuing certain means for a time, although the pressing necessity for them may have ceased. Attention to the bowels must be enjoined, and occasional diaphoresis by antimonials is advisable. Great caution relatively to the diet is necessary, and this is particularly the case with children. In a child recovering from the nephritis of scarlatina, a meal of *potatoes* caused scanty and bloody urine. (Johnson.)

Indigestible articles, and even proper food, *in too large quantity*, should be avoided; the appetite, often very strong, must be restrained. Beginning with beef-tea and veal- or chicken-broth,

¹ Johnson.

solids may be gradually resumed; but no animal food, in any shape, should be allowed until the tongue begins to look clean and the digestive powers to show healthy activity.

When convalescence is fairly established, a cautious tonic treatment should be resorted to. To renovate the impoverished blood is an obvious indication; and thus the strength, flesh, and colour will be gradually brought up to the healthy standard. Ferruginous preparations afford the chief reliance. The citrate of iron with the citrate of ammonia (or the ferri ammonio-citras) is very useful; the muriated tincture of iron, in infusion of calumba, is also deservedly popular with practitioners. The albuminous urine feels the effect of the latter medicine, and of gallic acid, and rapid improvement generally follows their use. Tincture of digitalis is sometimes usefully added to the muriated tincture of iron, should albumen continue or increase whilst using the latter, and particularly if the urine be lessened or become high-coloured.

The gallic acid is given in doses of ten grains, three or four times daily, in some mucilaginous vehicle. It should not, however, be administered until late in the disease, or early in the convalescence, not being suited to any of the conditions of the acute stage.

The resumption of personal liberty by the patient should be allowed with the greatest caution. The slightest error in diet, dress, or exertion, may long defer recovery, or, even worse, induce a fresh attack, not so amenable to treatment. When febrile action has ceased, desquamation wholly stopped, and dropsical effusion departed, the patient may rise from bed, and being warmly dressed, may sit up. If the cure be really established, he will gradually gain strength, and may be allowed to go out, especial regard being had to the weather. Flannel should be worn, and no exposure to cold, dampness, or stormy winds, permitted. A convalescent is sometimes allowed to take an airing in summer, before the albumen disappears from the urine; but by no means should this be sanctioned in chilly, wet, or actually cold weather. Recrudescence of the disorder would be very likely, a chronic inflammation, of a probably fatal nature, being nearly sure. Those who see much of the disease, refer most of the recurrences and serious chronic cases to the ignorance, carelessness, or obstinacy of convalescents. Dr. Johnson says "a patient should not be permitted to leave a hospital after an attack of acute nephritis so long as any trace of albumen remains in the urine, without being warned of the possibly

fatal consequences of his ill-advised step." A person, wilful enough to incur such a risk, should be compulsorily retained in hospital; and those under private medical advice, and equally incorrigible, should be given to understand that all bad consequences rest with them alone. The *poor* eminently need hospital care in these cases; it is indisputable that many die from the want of precaution, and from being forced to work just as convalescence is beginning. This is observable daily in dispensary practice, and patients often resort to the Central Offices of medical charities, who ought to be in bed, and would be, did their means allow. It is well remarked that "there are no cases which more urgently need that kind of treatment, which, amongst the poor, they cannot well receive out of a hospital."¹

It is well for convalescents to change the relations of life which have exposed them to the disease. The benefits of hygienic and sanatory regulations, publicly enforced, will do much, in connection with existing popular sentiment on these points, to remove those unhealthy influences to which the poor are particularly exposed.

Whatever is done to cheer the toilsome pathway of the needy, to make them cleanly, assist them to obtain comfortable dwellings, and to hold out inducements to industry, directly administers to health, and tends, moreover, to obviate intemperance and self-indulgence of similar nature, ever ready to offer a temporary oblivion to poverty and sorrow. Moral influences and cheerfulness are powerful in this, as in every malady; "a merry heart doeth good like a medicine."

B. CHRONIC DESQUAMATIVE NEPHRITIS.

General Observations.—This disease is occasionally a direct sequence on the acute form, especially when the latter is neglected, or insufficient care is taken during convalescence. There are cases where nothing seems capable of preventing its implantation upon its *congener*.

The distinction to be drawn between the two is important, and is derived from the visible signs and symptoms, as well as from *post-mortem* appearances. As in the acute malady, so in this form, desquamative action in the renal tubes is a diagnostic indication of the first importance. The epithelium is continuously thrown off,

¹ Johnson, *op. cit.*

and for a long time, and it is disintegrated more or less when seen in the urine. Finally, one of three conditions happens to the tubes; either atrophy, with loss of their lining epithelium, or their impaction with new and often unorganized material; or they may pour out serum and become dilated into cysts. The surface of the kidneys is irregular, and their substance firm, in most cases, with great diminution of bulk in the later stages of the disease. The renal bloodvessels become much altered, the circulation is of course embarrassed, and the blood poisoned. From this latter fact, mainly, arise cardiac affections, often structural in their nature, as hypertrophy and valvular disease, with cerebral disturbance, dropsy, and their concomitant difficulties.¹ Conversely to its state in acute nephritis, the urine is *increased* in quantity. Its specific gravity is said to vary, but it is most frequently below the natural standard. It is generally albuminous.

Etiology.—The causes of the affection are various. Gout, or some other constitutional taint or disorder, is often a remote agent in its induction. It has been said that the acute form stands in the light of a more direct cause. The character of the chronic inflammation may be its own from the first, no acute symptoms, proper, preceding or accompanying it. Intemperance is considered the chief cause of the disease. One writer² says, “nearly all the cases” are produced by it. The depressing passions, deficient food, and every influence, either physical or moral, which tends to lower the standard of health, are powerful etiological elements. The too sedentary occupations, combined with the action of impure air on the general system, and especially on the blood, place persons in most unfavourable positions either for escaping the disease or for recovery.

Morbid Anatomy.—The first deviation from a healthy appearance in the renal tubes, microscopically observed, is an opacity, with a fine, granular aspect, unusual to them. It is comparatively rare that an opportunity is secured of noticing the earliest changes in the organs. They are only seen when, death having occurred from another malady, renal disorder, perhaps wholly undeclared during life, is found to be commencing. There is no change of size or weight at this epoch, and the lobular markings are distinct and natural—a sign of but little structural change. This opacity, on

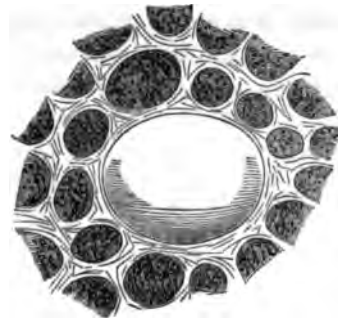
¹ Johnson.

² Ibid.

minute investigation, is found to be owing either to the complete filling of the tubes by the shedding of entire cells, or by these, disintegrated, after being thrown off, or else from cells partially destroyed before desquamation. In certain rare cases, the disintegrated epithelium is found in the tubes, but there seems no proof that entire desquamation is, or has been, going on. These appearances are said to be common enough after repeated attacks of gout and rheumatism. Very frequently there has been no symptom calling attention to any renal disorder. The skilful diagnostician, however, if he remember to examine the urine, will often find evidence of existing disturbance, even when its colour, quantity, and specific gravity, are nearly or quite natural, and no albumen exists; granular casts of the tubuli will be found amongst the sediment that subsides in small quantity, when the fluid is allowed to stand. Instant alarm should be taken at these indications, lest irremediable difficulty follow a too temporizing treatment.

The great difference between acute and chronic desquamative action upon the renal cells and tubes is, that the former may leave them and the surrounding tissue healthy when it subsides. The secreting power of the gland is unimpaired. A chronic desquamative nephritis, on the contrary, will finally destroy the cells, and no reproduction of them will take place. Here the foundation for the ruin of the organs is laid. The tubes, when crowded with epithelium, have no chance for re-formation of their lining; supposing the power to exist, there is not room for it. When the shed epithelium is broken down in the tubes, and is finally washed out, the lining membrane is left denuded, and the changes commence in the tube itself. Atrophy is said to be the most common result, and it exists in the same organ in various degrees. Under the microscope, the tubes can be more clearly seen, when in this state, by the addition of acetic acid. By the wasting of the tubes, the Malpighian bodies are approximated; sometimes three or four are nearly in contact with each other. The decay of the entire tubes follows naturally on the

Fig. 17.



Chronic desquamative nephritis. Tubules rendered opaque by accumulation of epithelium. Section of kidney. (After JOHNSON.)

destruction of their lining membrane, which is their essential portion, as respects both their activity and existence. This modified condition, and gradual failure of the tube-structure, it is thought, may explain the diminished density of the urine so constantly observed. The injured tubes would not secrete urine, but might still throw out a watery secretion, acting as a diluent to the urine formed by the remaining unaffected portions. It was formerly remarked that one explanation of the increased watery flow from the kidney might properly be referred to excitation of the Malpighian bodies by the epithelium constantly thrown into the tubes.

Contents of the Injured Tubes.—These are, unorganized fibrinous or albuminous material, oil, or serum.

The exudation of the first of these products is stated to be the result of a final effort of secretory power. There is force enough to separate the matter from the blood, but not to organize it. (Johnson, *op. cit.*, p. 215.) In certain cases, this deposit is but small; but little being seen in the form of tube-casts in the urine, or found in the tubes, *post-mortem*. Again, a little will be found in the urine—enough to diagnosticate the disease; it may, lastly, be very abundant in the urine passed, and give to the kidneys a waxy, yellowish-white look when examined, and which is very characteristic. This material is derived from denuded basement-membrane.

The diseased renal tubuli sometimes contain oil in this affection. They then suffer dilatation, and it has been supposed that the cysts which are now and then found, of sizes varying from that of a hazel-nut to that of a walnut, or larger, and filled with fatty matter, may thus be formed. It is believed that this oil is never washed out by the flow from the glands; consequently its appearance during life, in the urine, is not recognized.

When this dilatation occurs in the renal tubes, certain of them present a very delicate lining of transparent, nucleated cells,¹ capable

¹ Mr. Simon thus explains cyst-formation. The cysts are new productions within the tubes, not dilatations of them. Paget and Rokitsansky agree with him. The cyst, he believes, originates in a germ or nucleus, which, were the system and the organs healthy, would have given birth to an epithelial cell. Jones and Sieveking (*Path. Anat.*) adopt this view, but whilst they think it applicable as a rule, and especially ratified by those cases in which the cysts are very numerous, they still believe that the *large* cysts, developed but sparsely in the kidneys, are to be referred to the method of formation as announced by Johnson and Frerichs. Dr. Jones also thinks that a cyst may be developed from the capsule of a Malpighian body which has been compressed and spoiled,

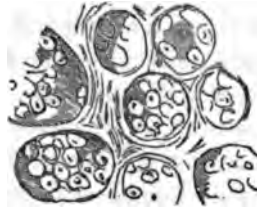
of pouring out a thin serous fluid. Generally, these tubes are either of, or slightly above, the normal calibre. They are probably in a process of dilatation, as those under the normal size are of atrophy. Hence a final formation of cysts; the latter may even attain a size visible to the naked eye.

The cysts contain an albuminous liquid, yellowish, sometimes brown; when of the latter colour, it is more viscid, and the contents may even be nearly solid. Fat, and amorphous dark pigment are found in the cysts containing dark-brown liquid. Now and then, certain of the constituents of the urine will appear in them; an uncommon occurrence, because the epithelial lining of the tubes, their essential part, is destroyed. Johnson has seen cholesterine, but oftener uncrystallized, vesicular fat, "free and scattered, or clustered in cells." He believes that the ciliated epithelium (which he considers exists in the convoluted renal tubes) being destroyed, as a consequence of the loss of the normal epithelium, a propelling force is lost which would otherwise hinder the accumulation of liquid in any tubes still retaining secretory power. Portions of broken epithelium, entangled or firmly lodged in the tubes, will not permit the egress of any fluid still secreted beyond the obstruction. Consequently, dilatation goes on, so long as secreting power continues. If the latter be in play when the obstruction occurs, then certain solid constituents of the urine will be found in the pent-up fluid—otherwise, only a watery or albuminous character will attach to it.

Circulation is unobstructed so long as a tube retains its secreting power. When this is suspended, the other ceases; obstruction by the *débris* of epithelial matter, etc., then follows much more readily.

"in the same way as from a portion of a tube." He speaks of oil as one of the contained matters in renal cysts, and of the usual clear fluid found in them, sometimes mixed with a granular or semi-granular matter. The larger cysts, he says, sometimes contain an endogenous cell-growth. A well-marked envelope of "distinct, homogeneous membrane," with occasional concentric laminae, is observed in them all. Attention is drawn by Dr. J. to the fact that oval or rounded fibrinous casts in the tubes, particularly when epithelium is "embedded in them," may closely simulate cysts.

Fig. 18.



Chronic desquamative nephritis. Section of tubes in which a layer of delicate nucleated cells has taken the place of the normal epithelial lining. (After JOHNSON.)

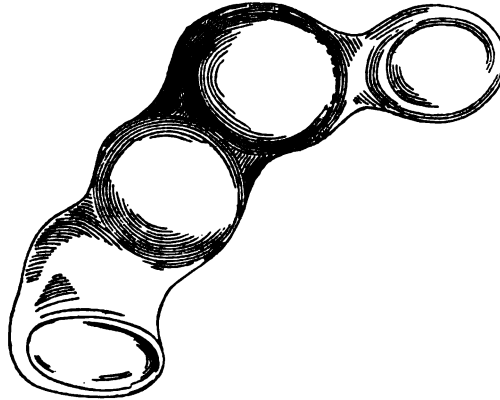
Sometimes, only a very few cysts will be formed; again, nearly the entire healthy tissue is displaced by them, and both the bulk and weight of the kidney are greatly increased. If the disease is continuous, they are less likely to occur than when temporary arrest has taken place. Johnson thinks that a *progressive* chronic desquamation involves all the tubes in the atrophy which attends it, whilst, on arrest of the disease, the denuded tubes are more readily formed into cysts, their own feeble circulation and nutrition being kept up by the remaining healthier tissues, and so their cyst-tendency is continued, as it were by foreign aid.

A long process of desquamative action, however, is necessary before the tubes become thus hopelessly denuded, and a state of readiness for cyst-formation induced. The latter is more often dependent on the desquamative, than on the disintegrative, action. Six months is assigned as the *minimum* duration before such a state of things would be expected. Hence is very justly deduced the importance of early knowledge of the existence of the affection. When soon detected, treatment, to have any chance of success, should be immediate.

Effects of the Diseased Condition of the Tubes on the External Appearance of the Kidneys.—At first, the kidneys show little or no alteration in form or bulk, nor is their weight changed. Slight superficial congestion is observed, but the lobular divisions are well-marked and natural. As the disease progresses, the rule seems to be that *atrophy* is established. The cortical substance suffers first, and gradually becomes so thin that the cones of the medullary substance approach the capsular investment of the organs. During this stage, the lobular partings become in a greater or less degree obliterated. Next, the waxy material, already mentioned, begins to be formed, and other changes of aspect follow. If only sparingly produced, the organs remain, for the most part, smooth, whilst wasting continuously; vascularity diminishes, and, in certain cases, the weight and dimensions of the organs are reduced to one-fourth of the normal standard. Now, the surface becomes wrinkled, is hard to the touch, of a grayish-white colour, with occasional patches of congested vessels. Contraction, commingling, and actual destruction of the medullary cones follow. No difference exists in the outward appearance of the kidneys in cases where true desquamation has alone been manifested, and those in which disintegration, without desquamation, is found. When the waxy material

has been freely deposited, the size and weight of the organs may not be materially altered; the cortex, under these circumstances, is of a yellowish-white hue, more or less intense in proportion to the waxy matter eliminated. The more deposit, the less vascularity. After this phase has existed some time, the capsules of the kidneys

Fig. 19.



Chronic desquamative nephritis. Tendency to cyst-formation. Portion of a tube much dilated, and bulging in the intervals of the fibrous rings by which it has, in parts, been constricted. The open mouth of the tube is seen at one cut extremity.—*Med.-Chir. Trans.*, vol. xxx. (Vide Johnson's Work.)

often become roughened by "firm, white granulations, varying in size from a pin-head to a pea." Previously to this, the capsules remain smooth. These granulations are the indices of the presence of the deposit, and, when the latter is scanty, show its site. Dr. Johnson has but rarely seen this deposit in the medullary cones, even when abundant in the cortex. He remarks that the thinning of the latter and the secondary deposition may, in these cases, go on very slowly.

Cysts are more freely developed and grow more readily when the waxy material is but sparingly furnished. Progressive atrophy involves *them*, also, in its action; and it is thus that disease, arrested in portions of the organs, leaving them healthy, allows the cysts to remain and supports their growth.

Both kidneys are nearly always simultaneously attacked; the disease may advance more rapidly in one, but scarcely an instance is known of one kidney only being affected.

The Renal Bloodvessels in Chronic Nephritis. Arteries.—The

renal arteries have two fibrous coats; the inner, longitudinal, the outer, circular. The latter, in its normal state, is much the thickest. They are considered muscular, and pathology confirms the opinion. Hypertrophy is often extreme in them, and both layers are affected. The inner layer, *contra naturam suam*, becomes as thick as the outer. The smaller arteries apparently undergo greater thickening, proportionately, than the larger. The structure of the vessels seems untouched; the hypertrophy is simple. In extreme atrophied states, the arterial coats have been seen twice or thrice the natural thickness.

The *tortuous course* of the vessels is referred to the obstruction of the circulation only, which is owing to the great disorganization of the secreting tissues. There are various shades of this hypertrophy of the arteries, according to the stage of the disease. The vessels are generally pervious; towards the last part of the affection, oil-globules are sometimes seen in them. It is believed that the fatty deposit is a consequence, not a cause, of the obstruction of the circulation, and it is referred to "the metamorphosis of the stagnant blood which remains in the vessel after the circulation has ceased."¹

Malpighian Capillaries.—The diseased appearances in these vessels are somewhat analogous to those observed in acute nephritis, at least in the latter stages of the chronic malady. There are other changes, however. The calibre of the vessels is but little, if at all, enlarged. Some consider it occasionally lessened. The Malpighian tuft is not, in itself, enlarged, but the vessels are crowded together and their coats thickened.² Their surface is generally smooth; occasionally, a little whitish, granular matter studs it, which is usually regarded as fibrinous. Injection generally penetrates them completely. Organized effusion, whether fibrous or cellular, is but very rarely found within the Malpighian capsule.

The application of acetic acid to thickened and opaque Malpighian vessels, shows blood corpuscles within them; the opacity concealing them from view when not thus treated. The next and last change is atrophy, shrinking, and anæmia of the Malpighian body, with shrivelling of the capsule. A few oil-globules are sometimes seen within the altered vessels.

The rarity of hæmaturia in chronic nephritis is partly explained

¹ Johnson.

² Bowman. Busk.

by the fact of the pressure of the thickened vessels upon each other—a sort of binding together—leaving no room for dilatation and rupture. The thickening is, in itself, a protective means. Occasionally, specks of hæmorrhage, from ruptured capillaries, appear on the cortical substance. These are convoluted tubes filled with the escaped blood. Hæmorrhage, when it happens, selects the earlier periods of the disease, before the vascular tunics are thickened.

Inter-tubular Capillaries.—No hypertrophy or thickening of these vessels being found, it is concluded that they become atrophied in common with the tubes amongst which they ramify; and it is probable that this is simultaneous with the loss of the lining epithelium in the latter. Injection of these vessels is a difficult matter; to see them without injection, still more so.

Veins.—The same is true of these, relatively to hypertrophy and thickening, as of the last-named vessels. The lobular markings traced by the “minute venous radicles” on the capsular surface of the kidney are wholly or nearly obliterated, and an anæmic state of the tissue induced. The larger branches are sometimes shrivelled and contain adherent coagula in their centre.

The Blood.—The following are the usual alterations in the constituents of the blood. The *serum* is increased in quantity, proportionably to the clot; its solid contents and density are equal to, or even greater than their normal amount; being the converse of what is observed in the acute disease. The serum and the albumen hold an apparently inverse ratio to each other as to the *density* of the one and the *quantity* of the other. Dr. Christison gives the following numbers. The natural density of the serum being from 1.029 to 1.031, and the salts and albumen from 816 to 853 in 10,000 parts of blood—in the middle of the disease, the urine being only moderately albuminous, the serum has a density of 1.024; the salts and albumen are from 630 to 660 in 10,000 parts. In advanced stages, the urine being only slightly coagulable, the density of the serum is 1.031; salts and albumen 973, in 10,000 parts. At the same period, in a case complicated with pleuritis, and general reaction being established—serum, 1.021; the other constituents, together, 583 in 10,000 parts. Both Johnson and Frerichs confirm the rule that the albumen continues to be deficient and the density of the serum low, throughout the last stages of chronic desquamative nephritis; the opposite would be wholly exceptional.

There is less of the buffy coat; when it is seen, the clot is small and firm. The fibrin is usually natural in its proportions, except it be increased by any local inflammation. The hæmotosine steadily diminishes; finally, it is only a third (or even less) of its amount in health. The effect of the disease, therefore, is rapidly to diminish the red particles; being, in this respect, strikingly analogous to severe or continued hæmorrhage.¹

When the urine is of low density, or very scanty, especially towards the last of the disorder, urea is found abundantly in the serum of the blood. In slighter amount, it is detected in the earlier stages; least of all with copious urine, even if of lower density than is normal. The profuse flow may possibly remove it before it can be taken up by the blood. When the urea enters largely into the circulation, as is undoubtedly often the case, the most serious consequences soon follow. Dr. Bright noticed that patients may long suffer with renal disease, and urea be detected in the blood, even at the beginning, yet no cerebral disturbance supervene until the last stage. He once observed a case of this nature during a period of from four to five years.

Dr. Rees, also, examined a patient's blood, who was perfectly sensible to the last moment of his life, yet urea was more plentifully found than he had ever seen it in Bright's disease. Referring to this, and to the nearly constant cerebral symptoms following deficient urinary excretion, Johnson remarks that we have no actual proof that the urea is the poisonous agent, or, at least, the only one. If it be the chief influence, as he suggests, some, as yet unknown, peculiar condition of the blood may be requisite for its efficient action. A *tenuity* of the blood is mentioned by Dr. Rees; and Dr. Watson alludes to the watery, anæmic character of the circulating fluid as a cause of cerebral disorder; there being a lack of appropriate and healthy stimulus to the brain.

Persons may also be variously susceptible to the action of urea; as is true of other poisons.² Frerichs³ believes that the carbonate of ammonia resulting from the decomposition of the urea in the bloodvessels, is the efficient cause in this species of blood-poisoning. He tested its presence by reddened litmus paper, and by the fumes

¹ Christison.

² If, indeed, urea be, *per se*, a poison; which nearly all observers now deny.

³ Die Bright'sche Nierenkrankheit., pp. 107—112. (Johnson, who inclines to the opinion.)

of muriatic acid from a rod dipped in that product and breathed upon by the patient. He also found it in the blood of human subjects, and in dogs experimented upon. By injection of carbonate of ammonia into the bloodvessels of dogs, convulsions were immediately produced.

Further experiments are requisite before the fact can be deemed indisputable. The peculiar agent supposed to act as a ferment in the blood, and so to cause decomposition of the urea, is not, as yet, identified, although the views of Frerichs have obtained an extensive credence. The term uræmic poisoning is seemingly no less appropriate, even if the explanation of Frerichs be adopted; since, without the introduction of urea in the first place, the successive phenomena ascribed to its decomposition could not be manifested. Some of the latest and most reliable researches favour the belief that the retention in the circulation, of carbonate of ammonia and extractive matters of the urine, is the cause of uræmic intoxication, with all its disastrous results. (See page 61.)

This theory, however, like almost every new scientific proposition, meets with criticism, counter-experiments, and denial of its truth. In this country, attention has recently been drawn to it by Dr. William A. Hammond, Assistant Surgeon in the U. S. Army, who, in January last, read before the Biological Society of Philadelphia, an account of some interesting experiments on dogs, made to test the effects of injecting urea and other substances into the blood. In one series of experiments, he removed the kidneys previous to injecting the substances; in the other, those organs were left intact. Whilst he admits the facts announced by Frerichs, he dissents from his theory. Urea and vesical mucus, sulphate of soda, nitrate of potash and carbonate of ammonia, were the substances injected.

Dr. H. did not detect ammonia in the breath of any of the animals operated on by injection of *urea*. He believes that its presence in Frerichs' cases was "accidental, that it is not to be regarded as an invariable attendant upon the retention of urea in the system." The removal of the kidneys, in the above experiments, seemed to have a marked influence upon the action of the introduced substances. Only one out of ten animals died where the organs were untouched, and that one from the effects of nitrate of potash; but all of the second series died after strong convulsions. Dr. Hammond argues that the condition of the animal without kidneys is analogous to that of persons suffering from Bright's disease, and that thus we

can judge of the effects of the presence of urea in the system, in large quantities, in that affection. The *analogy* is confessed, but, as the conclusions under analogical reasoning have always a shade of doubt or fallacy about them, so it is here; there may be some subtle, undetected differences in the action and results of Morbus Brightii, which somewhat change the aspect of the matter, and modify the phenomena.

Dr. Hammond would ascribe "the condition known as uræmic intoxication to the direct action of an excessive accumulation of urea in the system;" and he thinks the fact of its harmlessness in the blood of some persons with Bright's disease, is owing to their slighter susceptibility to its action than others.

The author's *conclusions* from his experiments are:—

"1. That urea—simple, and combined with vesical mucus—carbonate of ammonia, and sulphate of soda, when injected into the bloodvessels of sound animals, do not cause death.

"2. That nitrate of potash, when thus introduced, is speedily fatal.

"3. That death ensues from the injection of any of the foregoing named substances into the circulation of animals whose kidneys have been previously extirpated.

"4. That in neither case does urea, when introduced directly into the circulation, undergo conversion into carbonate of ammonia." (See the *North American Medico-Chirurgical Review*, March, 1858.)

Deductions as to the Proximate Cause of Albuminous Urine.—

From the very ingenious experiments of Dr. John Reid¹ on asphyxia, the ideas furnishing an explanation of the causation of albuminous urine, occurred to Dr. George Johnson. It is sufficient for our purpose to state that the *hæmadynometer* demonstrates (in the experiment where black, unoxygenated blood is forcibly made to traverse the arteries and systemic capillaries) an obstruction or arrest of the circulation in them. When the blood is rendered unfit for nourishing parts, it is found to traverse the capillaries with more or less difficulty, or even to stagnate in them. Hence various degrees of circulatory disturbance, and consequent organic disease. Analogous to the effect of retained carbonic acid on the pulmonary, is that of retained urinary constituents on the renal circulation; and, continuing the analogy, we look to the inter-tubular capillaries

¹ On the Order of Succession in which the Vital Actions are arrested in Asphyxia. (Physiological, Anatomical, and Pathological Researches, p. 17.)

as the first to suffer. The Malpighian and arterial vessels successively feel the action of the morbid agency. The resulting stagnation affords a remarkable parallel to that observed in the right side of the heart, and in the veins, in the animals artificially asphyxiated in Dr. Reid's experiments.

From the subsequently observed hypertrophy of the renal arterial tunics, we derive proof that their activity has been abnormally increased.

A sort of supplementary carrying-duty has been imposed upon them in consequence of the obstructed condition of the Malpighian capillaries, and, prior to that, of the inter-tubular vessels.¹

It is clearly deducible from this progressive action, that the original obstruction must be in the *inter-tubular capillaries*, the other vessels being situated behind them.² These practical deductions are essential to a scientific appreciation of the pathology of chronic desquamative nephritis in this particular connection.

According to the amount of atrophy in, and consequent loss of, the renal bloodvessels, will be the amount of escaping albumen. When a large number are unharmed, as in the early stage of the disease, there is more chance for over-distension and exudation of albumen, and its appearance in the urine, than in the opposite condition. A diminution in the number of the Malpighian bodies is believed to contribute more to the lessening of albuminous secretion than their thickening does; it being supposable that the latter impedes the outpouring of serum. An analogy seems to exist between the convoluted tubes and the mucous membranes, whilst the serous membranes stand similarly related to the Malpighian bodies. When the mucous membranes are diseased, no albumen is ordinarily thrown out by them; so, whilst the glandular epithelium of the renal tubes remains, it seemingly prevents any albuminous transudation. But, let it be destroyed (or if only the delicate cells before mentioned remain) and the tubes are thus brought into a closer resemblance to serous membranes, we find albumen in the contents of the altered tubes or in the cysts developed from them.³

The following, then, is the order of disturbance, and the source of albuminous production:—1. Obstruction in the inter-tubular capillaries, from disease in the secreting cells; propagation of this to the Malpighian capillaries and to the arteries. 2. Hæmorrhage

Johnson.

² Bowman.

³ Johnson.

into the tubes, consequent on impeded circulation; serum escaping from the Malpighian capillaries.

When disorder has attained such an intensity in the secreting cells, that the blood sent to them can be no longer depurated; and when reaction, in the form of retained urinary constituents occurs, there must necessarily be accompanying congestion, and consequent destructive action. This is the epoch when the impure blood is denied free passage by the vessels it offends. Albuminous urine is remarked nearly simultaneously with this struggle and lesion.¹

Deductions relative to Dropsy in Nephritic Disease.—The experiments of Dr. Reid are regarded as analogically proving the production of renal dropsy from impeded circulation through the systemic capillaries. The frequent occurrence of hypertrophy of the left ventricle of the heart in chronic renal disease, is referred to as confirmatory of this belief. If this obstruction be proved, it is not difficult to declare dropsical effusion to be the result.

Both albuminous urine and dropsy recognize the same or similar etiological conditions. The deteriorated blood, unfit for circulation, is transuded through the injured arterial walls; and this is better than its continued circulation. Two different conditions are believed to conduce to the production of dropsy in renal disease. Circulatory obstruction being recognized as the originating force, this may either depend on disease of the blood (the capillaries being directly acted upon); or may spring from cardiac or hepatic disorder—or from some mechanical source—as pressure upon a venous trunk.

The capillaries are affected through the medium of the veins; they become engorged, and, as in the former cases, the effusion takes place from them.² The retardation and obstruction of the circulation consequent upon any marked depravation of the blood, whilst they are very generally felt, are most apparent and severe in the capillary system of the organ or organs whose office it is to eliminate the particular materials wrongly retained. There are many other matters properly foreign to the circulating fluid, which do not so rapidly, if at all, interfere with the performance of function or the integrity of tissue. Thus, bile in the blood is probably never

¹ These deductions are general; and applicable to all the forms of renal disease. The lesions of chronic nephritis well illustrate the positions.

² Johnson.

causative of dropsy. Every one is aware that its presence is accompanied by unnatural drowsiness, but it certainly is not attended by those serious cerebral difficulties which follow the retention of urinary excrementitious matters. Perversion of urinary function and especially any morbid action which distinctly interferes with its normal secretion and excretion, is always followed by systemic disturbance. The great importance of the kidneys as purifiers of the blood is manifest from this fact.

When their function is impaired, and especially if the cause be continuous, nothing would be more likely to occur as one of the sequelæ, than dropsical effusion. Inefficient renal action, therefore, combined with an impoverished, watery blood, may be considered preparatory to, if not directly causative of dropsy. That the latter occurs under precisely the converse conditions, is true; and it may also be very marked at the outset of renal disease, before there has been much, if any, destructive action or poisoning of the blood; the colouring matter and albumen of the latter not being drained away. So, patients in the last stages of chronic desquamative nephritis may become dropsical, although the urine be copious and frequently passed. The grounds of its production, however, in the majority of cases, are undoubtedly those above mentioned, and impeded capillary circulation may be considered its proximate cause. We may, moreover, reasonably conclude that the larger the amount of urinary constituents retained in the blood, and the more rapidly they accumulate, the greater is the danger of dropsy. If the patient be, previously, or become very anæmic, and if the urine be scanty, the risk is more imminent. In illustration of this assertion, Johnson refers to the fact of the rare occurrence of dropsy in chronic desquamative nephritis, in which, as has been stated, the flow of urine is usually throughout very abundant. A case is referred to by him, in which, notwithstanding marked hypertrophy of the left ventricle, indicating extensive obstruction of the capillary circulation, there was no dropsy. He believes that a more impoverished, watery blood than that of his patient, would have been all that was necessary to induce the symptom under such circumstances.

Recapitulation of the Characteristics of Chronic Desquamative Nephritis.—The disease is characterized by a continuous shedding of epithelium in a more or less disintegrated state, in contradistinction to the entire casts thrown off in the acute form. Loss

of the epithelial tube-lining, atrophy and destruction of the tubes succeed; or else a continuance of sufficient secretive power to exude serum and form cysts. The bloodvessels are very extensively altered; and the form and texture of the kidney also. The urine, almost constantly albuminous, varies considerably in quantity and specific gravity; the former is usually increased, the latter diminished. The blood is much changed, and many complications of disease result from this; such as anæmia, dropsy, inflammation of the serous membranes, cerebral affections. Their bearing and reciprocal action will be again referred to under the head of Prognosis. The etiology has been shown to be of great importance pathologically; as in acute nephritis, so here, it will be seen how essential a knowledge of it is for the purposes of prevention and cure. The general proposition, ratified by abundant experience, should be, that *a depraved condition of the blood is the foundation of disorder*; and its deterioration springs from various sources. According as a patient's constitution is good, free from hereditary taint, unabused, or *vice versâ*, and in proportion to the comforts of life at his command, and the temptations to which he yields, will be the likelihood of attack, its intensity, rapidity, extent, and behaviour under treatment.

Rayer speaks of chronic nephritis as sometimes alone consisting of a series of very slight attacks in different parts of the kidneys. He has remarked that induration of the renal substance is the most common anatomical alteration. Habitual pain in the renal regions, with diminished acidity of the urine, its neutrality, or even alkalinity, together with a sensation of weakness in the lower limbs, are the most usually observed general signs of chronic nephritis. This condition is deemed particularly favourable to the production of phosphatic calculi. The general cachexia induced by chronic nephritis is a well-known predisponent to many other diseases.

Phthisis is instanced by Rayer, and he has not remarked either blood or albumen in the urine of patients with chronic nephritis, except there be disease in the bladder, prostate gland, or urethra. Hæmorrhage is certainly rare in the chronic disorder, but Rayer is somewhat at issue with most observers upon the latter point. The formation of pus is alluded to by him in connection with inflammation of the mucous lining membrane of the pelvis, of the kidney, and the continuous passages. In reference to the remark

on the paucity of albumen, it may be said that chronic nephritis could hardly long continue without concomitant disorder in some of the other organs to which Rayer has referred; but, whenever the renal structure, overtasked in its eliminative duties, becomes impaired in the way we have seen, we are liable to find albuminous urine.

Prognosis.—Whilst it is true of nearly every malady that its progress depends greatly on its etiology, it seems peculiarly so of both forms of nephritis. The constitution of the individual is a very essential prognostic element. An attack of the disease, of slight or of medium intensity, would be productive of serious symptoms in a broken constitution; but a vigorous person might readily recover. The fact of both organs being attacked is of serious import.¹ It is well known that there is a latent chronic nephritis, and that extensive renal disease sometimes escapes detection by the most skilful observers during the lifetime of the patient, unless the urine be closely scrutinized. Such an examination, when there are no special existing indications, is too often neglected. But when disease attacks both the kidneys, we generally have very distinct manifestations of its presence. As there is no kidney in this case to do the work of the disabled one, we are more sure to find renal symptoms, and we expect a more unfavourable result. The patient, who has borne the brunt of extreme poverty, exposure, lack of food, and sickness, is ill-prepared to meet an attack upon such important organs as the kidneys. If acute nephritis have preceded, the augury must be yet more unfavourable. Hereditary gout especially inspires a bad prognosis. It is undoubted that the desquamative process is quickened during a fit of gout, but it subsides when the paroxysm lessens and retires. Therefore, too grave an opinion need not be given. Dr. Johnson has noticed this, in connection with a similar remark as to the prognostic bearing and influence of certain local inflammations. He also insists upon a thorough knowledge of the *stage* of the disease before deciding on its probable termination. Diagnosis is here, as in most studies of individual disorders, our main stay, and unless it has been carefully settled, we are "quite at sea" as to foretelling issues or deciding upon remedial attempts.

Not much dependence can be placed upon the previous history

¹ Grisolle. Dalmás, *et alii*.

of the patient's disease, either relatively to diagnosis or prognosis. His own account cannot be implicitly trusted; if affluent and indolent, he may exaggerate, unconsciously even, his feelings; if ignorant and poor, he may not know how to describe, or may have disregarded the earlier disordered sensations, whilst striving to labour, after their accession. Moreover, the well-known insidiousness of the malady too often precludes accurate conclusions based on *time*. There are, however, many cases in which indispensable information may be derived from an investigation into the probable duration and history of the affection.

It is quite in accordance with a common-sense view of the etiology of the disease, in reference to prognosis, that "avoidable causes" should occasion us less uneasiness, provided the physician's warnings and advice be regarded, and he have early care of the patient. Thus, too free living and recklessness of exposure on the part of the rich, as well as over-anxiety and excessive mental or bodily labour, may be obviated while the disease is only incipient. On the other hand, where causes beyond the control of either patient or physician (or such as are connived at by the former) are in operation, the chances of recovery are lessened. With even seasonable knowledge of them, it might be difficult, perhaps impossible, to prevent their action to some extent. There are, moreover, many influences unfavourable to the last degree, over which the medical adviser has almost no control; and here the worst is always to be feared. There is often a secrecy about these which even intimate friends do not fathom. There are those who endure mental trouble, depression, and anxiety, and who, for a long time, wholly conceal their sufferings. Intemperate habits are often carried on clandestinely, to an extreme which would hardly be credited. These agencies, and others derived from hereditary and constitutional disease or feebleness, are those most potent in prolonging chronic nephritis, and in diminishing the chances of recovery. Rayer remarks that the most unfavourable prognosis is warrantable when the cause of the disorder cannot be controlled, even if the primitive symptoms be slight.

A marked diminution of the renal secretion (to one-fourth of its usual amount—*Christison*) is a very bad sign. If still more diminution occur, most serious, and generally fatal cerebral disturbance follows. Persons continue, however, in fair health when the urine is reduced to one-third of its normal quantity.

By universal testimony, there is more difficulty in curing chronic renal disease implanted upon the acute form, than when it is primitive. Suppuration is of bad import. Complete suppression of urine, its putridity, with supervening cerebral symptoms, are some of the gravest indications.¹

Directly Favourable Circumstances.—Comfortable condition, socially; unimpaired constitution; judicious watching by friends; absence of complications and secondary affections; willingness on the patient's part to obey advice; early medical treatment.²

Complications; their Effects and Prognostic Value.—The immediately antecedent, or causative, and the secondary affections deserve careful attention. Not only do they aggravate the renal difficulty when that is primary, but many of them mask it for a while, and thus enable it to gain ground.

Dropsy is one of this number; but it is less common in this than in other forms of renal disease, in consequence, probably, of the free flow of urine nearly always observed; at all events, towards the middle stage.

It is true that serous collections do take place whilst patients pass urine copiously; but this is comparatively infrequent. Anasarca is more usual than ascites; and the latter seldom exists alone, except there be some local cause.

Excessive dropsical effusion, by its remote, no less than its direct, action, is decidedly against the patient. Sudden disappearance of large dropsical effusions is alarming. If cerebral disorder have previously been declared, it is sure to be increased; if not present, it is very likely to appear.

Severe and persistent dyspeptic symptoms are quite common. In connection with dropsical effusion, they occasion great distress; and any imprudence in diet may induce the most serious trouble. Dr. Johnson refers to a case where extensive dropsy and regurgitant disease of the aortic valves accompanied renal disorder, and death succeeded a too "hearty dinner." Urgent dyspnoea, following a previous excess, had given warning of danger, and the same

¹ The cyst-formation in the tubes, whether explained after Simon or Johnson, is unfavourable; but the majority of cases presenting it, says the latter, are untended by serious results. (*Loc. cit.*, p. 263.)

² "*Last, not least.*" The disease, it may be added, tends more towards recovery than any form of chronic renal disorder; its progress is but a continued remedial effort.

symptoms accompanied the fatal error. As the man was in Ki College Hospital, it is remarkable he was not kept under close surveillance.

Chronic vomiting, pyrosis, and diarrhoea are frequent, and sometimes serious complications. When water-brash is noticed, the liquid thrown off may have either an acid, an alkaline, or a neutral action. Dr. Johnson refers to the experiments of MM. Bernard Barreswil, who extirpated the kidneys of dogs and found ammonia very abundant in the stomach and intestines, which they believe to arise from the decomposition of urea. This fact was referred to when discussing the action of urea retained in the blood and sent to the brain.¹ The "dark colour and offensive smell" of the urine when the urinary secretion is very scanty, is spoken of in this connection as possibly thus explained. The urea did not accumulate in the blood in the animals experimented upon, until the stomach and bowels lost the power, through the gradual failure of strength, of throwing it out of the system.²

Vicarious or supplementary action may be accounted the occasion of both vomiting and diarrhoea. The kidneys being more or less *hors de combat*, the digestive organs take up, as well as they can, the performance of a function not properly theirs. Hence the natural occurrence of disturbed action in them. Vascularity, and deepened colour of the gastric and intestinal coats, has been marked *post-mortem*, with occasional evidence of increased mucous secretion. Ulceration has also been found.

Bronchial irritation, or troublesome and long-continued bronchitis, with extreme dyspnoea, are sometimes observed in connection with chronic nephritis. Pneumonia is said to be more common as a consequence of the acute form. Its occasional latency and frequently insidious approach in both affections are fraught with danger to the patient, and should be watched with anxiety.

Phthisis is seldom associated with chronic desquamative nephritis; the best authorities do not recognize any relationship between them. That chronic renal disease may sometimes follow tubercular phthisis is not unlikely. Any debilitating and exhausting disease, however, might have fully as much power to develop it, and there are many far more causative.

Pleurisy, pericarditis, and peritonitis are observed in the late

¹ Vide 61st page.

² Johnson.

stages. They are named in the order of their frequency. As would be expected, they may occur in conjunction, the two former especially.

Diseases in themselves so formidable are much more to be dreaded in company with chronic renal inflammation. Sudden checking of the free performance of function in the kidney, with consequent retention of urinary matters in the blood, is a frequent cause of their supervention. Their mode of attack may be sudden and severe, or latent and hardly declared symptomatically. The peritoneum may often be very much diseased, when nothing has distinctly indicated the nature of the affection.¹

Rheumatism, especially of the muscular type, and often very persistent and rebellious under treatment, was first remarked as a common complication by Christison. It is noticed that any marked swelling and redness of the affected parts are infrequent. Both Christison and Johnson believe that it is less common when much dropsy is present, than when the opposite is true. The latter author attributes it without hesitation to poisoning of the blood by renal disease.

Cerebral affections, and especially those in which convulsive movements, or a drowsy, comatose condition supervene, are the most alarming of any of the secondary diseases; and these grave symptoms are so common that certain authors consider them a very usual termination of the disease. Sudden in their access in acute nephritis, the converse is observed of the chronic form; a tendency to somnolency being first noticed, which advances in intensity, until complete stupor supervenes. Delirium, dim vision, and epileptiform convulsions precede the soporose state, which augments in intensity and is rapidly followed by death. In certain cases, convulsions succeed a slight cephalalgia, and recur at variable intervals, alternating with delirium or stupor. A fatal termination is inevitable. A case is given where the coma, finally destructive, was "preceded by a sudden hemiplegic seizure; the whole attack resembling cerebral apoplexy." (Johnson.) There are instances in which true hemorrhagic effusion into the cerebral substance has been found causative of death. Generally, however, no cerebral lesions are discovered in chronic, any more than in acute, nephritis. When there are evident symptoms of retention of urea in the blood,

¹ Johnson.

prognosis is invariably unfavourable. Epileptic seizures are regarded as of scarcely less grave import than coma. The latter, when complete, renders the case hopeless.¹

It is a familiar fact that cardiac affections are very frequently associated with renal; and this is especially true of those accompanied by albuminous urine. This observation, originally insisted on by Dr. Bright, is confirmed by all subsequent authorities.

The local explanation last suggested by Dr. Bright is adopted by Johnson, viz., that an "altered quality of the blood affords irregular and unwonted stimulus to the organ;" whence a change in the capillary apparatus, and obstruction, with hypertrophy of the cardiac walls, directly dependent on the renal difficulty. One of the chief causes of chronic nephritis, intemperance, frequently induces serious hepatic disease. As might be expected, the two affections are not infrequently conjoined. Disorder in one organ (as the liver)² seems sometimes excitative of disturbance in the other.

Cirrhosis is the most frequent of the concomitant hepatic affections. The liver being hardened and atrophied, ascites and anasarca supervene. The observation of Christison, that, when ascites is the prevailing dropsical manifestation, the liver is undoubtedly very much disorganized, is of great importance. The union of serious disorder in two glandular organs so essential to the integrity of health, and whose unimpaired functions are a vital necessity, gives a most discouraging aspect to a case.

Resumé.—Cerebral diseases are the most dangerous complications; inflammations, as pleuritis, peritonitis, pneumonia, are very serious additions. Cardiac and hepatic affections, whether accompanied by anasarca and ascites, or not, are also extremely dangerous: the supervention of erysipelas, especially if there be sloughing of the skin and cellular tissue, is a grave complication. Sudden suppression of the urine is unfavourable in the extreme. Moreover, whenever the urine indicates extensive disorder in the kidneys, there is great peril, even when no complications exist. Propagation of inflammatory action to the ureters, bladder and urethra, renders recovery doubtful; the converse order is fully as effective.

¹ A valuable article upon Apoplexy in relation to chronic renal disease, by W. Senhouse Kirkes, M. D., of London, may be advantageously consulted in this connection. (See *Braithwaite's Retrospect*, part xxxiii. American edition, July, 1856.)

² And, conversely, the kidney.

Treatment.—(a) *Prevention.* Whilst it is difficult for the physician to extend a salutary warning in many cases, in others he decidedly has it in his power. In those whose families are hereditarily predisposed to renal difficulties or to affections deemed causative of them, a timely word of caution may prevent much suffering—perhaps even irremediable disease. “Avoidable causes,” too, may often be warded off by correcting faulty *habits*. If prevention be not possible, we may often thus weaken the onset of the affection, and render cure more likely.

(b) *Constitutional Means.* All constitutional taint and disorder should be primarily dealt with, provided the patient be early seen, and will observe directions. A strong effort should be made to purify the blood and to relieve the burdened organs. If *gout* be the morbid agent, careful regulation of the diet claims our first attention. Next, every facility should be afforded the associated excretory organs in the performance of their functions.

In connection with diet, it should be remembered that dyspepsia is a frequent concomitant of renal disease, in addition to its influence in aggravating or even inducing *gout*. Plain, easily digested food in small quantity and slowly eaten, at regular intervals, is alone admissible. Patients, however, are not to be *starved*. It is well known that the indigent frequently suffer from renal disease; and in like manner, the rich, if kept too low, or if in the habit of nervously dwelling upon their diet, may fall into the snare they seek to escape. Strong mental emotions, especially of a depressing nature, will probably aggravate the evil, whilst judicious moral influences are invaluable.

Meat is allowed, if there be no fever or complication specially contra-indicating. Some permit its use twice a day. In the case of sedentary persons, once seems sufficient; and its quality must be suited to the stomach about to receive it. This is not always an easy matter, but is best arranged *for*, and not *by* the invalid. Whilst his inclinations may be easily gathered, any really necessary modification of them may be judiciously made by the physician. Vegetables should be chosen with due discrimination as to quality and quantity; especially when indigestion exists and flatulence is troublesome. Every fit of indigestion is a drawback to recovery, and often a direct incentive to disease. Pastry, spiced food, and rich greasy dishes should be discarded. Dr. Prout advises against the use of sugar also; he recommends “poultry, mutton, and the

lighter kinds of fish;" and the usually recognized, safe, farinaceous articles of food. Of course, ale, beer, and most wines are inadmissible in cases depending upon, or connected with the gouty diathesis; unless, indeed, there be *atonic* gout, where it may be necessary to resort to some stimulant or tonic. In cases where chronic renal disease exists alone, good beer and wine have been very properly recommended. There are, also, persons who have been accustomed to use these drinks, in whom, as in certain other affections, it would not be safe to withdraw them immediately or entirely.

The greatest attention as to proper clothing is requisite. Any exposure to cold or wet is a powerful exciting cause of this and kindred affections. Warm and sufficient garments are indispensable. It is recommended that flannel be worn throughout the year, next the skin; and this may be easily done by adapting the thickness to the temperature. Other remedies often fail through neglect of these precautions.

The nature of *acute* nephritis renders the rest, warmth, and security of the bed necessary; this is not so true of the chronic disease, and patients should be permitted to take exercise in good weather; fatigue, however, should be avoided; and often the existence of a complicating affection may forbid egress. The mode of taking exercise, and its quantity, must of course vary with each individual's ability. Horseback exercise is safe for some, whilst to others it would prove injurious. A cautious trial will determine this. Land and sea travel are strongly advocated in chronic nephritis. They act by a general hygienic influence, and have a salutary effect by their moral action, in diverting the mind and dispelling hypochondriasis. A favoured class only can avail themselves of this valuable resource. The poorer patient, even if he go to sea, must probably "work his passage," and perhaps the privation and hardship so often the sailor's companions, would but too surely defeat any benefit derivable from the voyage. The sea has been thought peculiarly favourable when comfort can be combined with the change. There are instances given which corroborate the beneficial agency of sea voyages, even under difficulties. Thus, Dr. Johnson narrates the story of a woman, the wife of a soldier, affected with severe renal disease, who while at sea, without any medical attendance, improved rapidly, and worked hard as a washerwoman after her first voyage. Relapsing afterwards, from

exposure in her work, she died. From a very ill condition, she had improved so as to labour, apparently by the agency of sea-travelling only. Had there not been subsequent exposure, she might have entirely recovered. She had been in various countries and climates, and was always better in the cool and temperate, than in the warm. This may be remembered as an element of hygienic management not infrequently applicable.

Too much caution, however, can hardly be exercised in advising patients with advanced renal disease to take a long voyage. The convenient, but frequently reprehensible counsel of this sort which is given, may prove fatal to the patient, or at least increase his discomfort. The advice which now sends pulmonary invalids to cold and dry, instead of warm and humid localities, may in many instances be followed in chronic nephritis. The risk of sudden alterations of temperature is always to be avoided as well as whatever debilitates. A chronic renal difficulty, which might possibly be cured, or with which life might be greatly prolonged, may often be aggravated into rapidly fatal disease by ill-advised travel. An exposure to a strong draught of cold air, even in summer, is extremely dangerous. If the body have been previously heated by exercise, the peril is still greater. These remarks apply all the more forcibly to those patients who have any pulmonary affection combined with the renal disease; and the existence of dropsy is another weighty reason for caution.

The functions of the skin must be kept in a healthy condition, and with the precautions to be observed in regard to clothing, the warm water, air, or vapour-bath has been advised occasionally. Diaphoretics may be properly conjoined. The citrate of ammonia is both effective and pleasant. When the skin is hot and dry, antimonials are proper, and are particularly useful if there be any pulmonary inflammation.

Dr. Barlow recommends them because they divert or determine action "*from the kidneys instead of to them.*" (*Practice of Medicine*, Eng. ed., p. 476.) In chronic nephritis, whilst it is requisite to maintain a proper action from the bowels, active purgation is neither admissible nor needed. The wine, or the acetous extract of colchicum, in connection with some mild aperient, in cases of gouty complication, is recommended. The formula is from one-half to one grain of the acetous extract, with from three to five grains of the compound colocynth pill, every night or every other night. The

wine of colchicum, with sulphate and carbonate of magnesia, is considered useful when the urine is acid and deposits the urates.¹

Cupping over the loins, early in the affection, and to a moderate amount, is sometimes advisable, the urine being albuminous, scanty, and high-coloured. Pain, heat, and uneasiness may be relieved by it. This is a means to be resorted to sparingly, and only when peremptorily demanded. The practice becomes more and more exceptionable as the disease advances. Dry cupping is advised at this stage; and it may be repeated even twice daily for some time. It is considered a valuable revulsive agent. There are many other counter-irritants used. It is a principle to avoid *cantharides* and *turpentine*. Ammonia, mustard, antimonial ointment (with great care) and certain other common means may be safely employed. We would again suggest the use of *chloroform* applied on flannel or spongio-piline, as both counter-irritant and sedative in its effects. Exhausting counter-irritants should never be used; and if Dr. Johnson considers the seton and issue of doubtful expediency, we incline to place *antimonial ointment* in the same category. It is well known what troublesome sores are occasioned, not infrequently, by its application to the chest; and the teasing effect of a painful ulceration must exert a bad influence upon the whole system.

(c) *Remedies administered internally. General or systemic.* Tonics are often requisite in the debilitated state to which some patients are reduced. The bitter vegetable ones are occasionally advisable, as *calumba* (Johnson) in the form of infusion. The anæmic condition needs ferruginous preparations; and, although these may be slow of action and occasionally inefficacious, they still are very valuable. The existence of any cerebral disturbance, or tendency to it, should contra-indicate the administration of iron, and it should always be cautiously managed, even in excessively anæmiated patients. Dr. Barlow (*op. cit.*) in considering the treatment of Bright's disease, under which head he indiscriminately, "for convenience" sake, includes all renal disorders accompanied by albuminous urine, speaks highly of the sulphate of zinc as a tonic. Its use in chronic nephritis is not open to certain charges which may be reasonably brought against iron, especially if there be any sign or apprehension of cerebral disease. The muriated tincture

¹ *Op. cit.*, p. 274.

of iron is a favourite remedy in this form of nephritis. Its astringent action is thought potential in checking the albuminous drain from the kidneys, and its employment with this end in view, in addition to its general tonic action, is advisable, except the kidneys show signs of congestion, by heat, weight, and fulness in the lumbar region, with scanty and high-coloured urine. Tincture of digitalis is occasionally useful in combination with the tincture of the muriate of iron; and so is the sulphate of iron, in pilular form, with aromatics.¹

The excitation of the renal function by diuretics is no more proper in this than in the acute form of the malady. The elimination of fluid, so to speak, must be derivative and rather by cathartic and sudorific action. The cautious use of mercury is well, but there should be good reasons for giving it; and its reckless employment can by no means be sanctioned. If other remedies have failed to remove dropsical effusion, and distress is great from its continuance or increase, we have good authority for adding mercury to such diuretics as may under these circumstances alone be imperatively demanded. These medicines are to be, if possible, avoided. Dr. Todd very positively condemns the use of mercury in cases of "acute dropsy." (*Lectures*, 1857.)

(d) *Treatment of Complications*.—1. *Dropsy*. Whatever tends to restore the integrity of the kidneys is an indirect treatment of dropsical conditions; and the means resorted to with the first intent are effectual for the latter. In chronic nephritis, however, and especially during the latter stages, we have less chance than in the acute form thus "to kill two birds with one stone;" special measures must often be adopted. Active purgation is certainly the most feasible method. The powerful watery purgatives should be employed. The experience of all sound observers sanctions the use of elaterium, gamboge, and jalap. To increase the flow of water from the bowels, salines may be added. It has often happened that a dropsical patient, apparently moribund from exhaustion, is restored as it were to new life by the free action of elaterium. Its use is recommended in pilular form; one-eighth to one-fourth of a grain, made up with aromatics. The occasional griping and sickness attending its action are but of little consequence, in comparison

¹ Johnson, *et al.*

with the astonishing relief nearly always afforded.¹ If, moreover, as Dr. Golding Bird has noticed, the intestinal discharges sometimes show an abundant evacuation of urea under the influence of the medicine, it may thus prove invaluable. Gamboge, in the dose of from five to seven and even nine grains, is a favourite medicine with Christison. Aromatics and the bitartrate of potash (3ss) may be added, and this amount administered *pro re nata* according to its action.

It should be an object always to keep up the strength of patients, and when powerful cathartics have been employed, we must remember that the consequent drain is very large. Too great or too long continued depletory measures, in any disease, are unwise, and often defeat the end in view. The appreciation of this fact has doubtless led to a less indiscriminate use of the lancet in our days. It should be the endeavour, often a very difficult one, to leave the patient strength enough to recover upon, ability enough in the system to respond to the action of the remedies we apply;—*ne quid nimis*. We accordingly find that judicious practitioners advise the careful allowance of nourishing food, and even of stimulants on occasion. The call for this management may often be quite imperative. Brandy and water with the food, and iron combined with the necessary purgatives, are mentioned.

We should, moreover, be careful not to interfere with spontaneous efforts of nature at removal of a symptom or condition. Thus she may render purgation superfluous, by setting up an analogous action herself. This, within due bounds, should not be meddled with. It is only when such efforts lead to excessive results and visibly weaken the patient, or are in the physician's opinion needless, that they should be gradually restrained.

Action upon the skin has already been referred to as a useful means of removing, to some extent, a dropsical effusion. The transpiratory effect of the hot air bath is soothing to the patient, and often very salutary. The service rendered by diaphoretics has been mentioned. Great care should be taken, after using these agents, to avoid a sudden cooling of the surface of the body.

It is obvious, that when the injured renal structures have already more than they can do to elaborate the urine, no further tax should be laid upon them. If we stimulate organs already

¹ It is important to obtain good elaterium. Dr. Johnson appropriately refers to the frequent adulterations practised. (*Op. cit.*, p. 280.)

overworked, we of course administer to the destructive, and not to the recuperative processes. This is like "whipping and spurring a maimed horse."¹ If, as Professor Krähmer demonstrates, the solid excreta by urine, the kidneys being healthy, are not increased by diuretics, how should they be when these organs are crippled by disease? (*Brit. and For. Rev.*, July, 1848.) Any other means, then, rather than diuretics—of that class at least which exercise no chemical action on substances out of the body—should be employed to diminish dropsical collections. And moreover, as Dr. Golding Bird's postulate expresses it, they are renal hydragogues, not renal depurants. The latter alone could be of real service. There are cases, however, when nothing else seems available. Our course then must be to use the least stimulating diuretics. If thus the renal disease is temporarily or even permanently aggravated, we are not amenable to blame, provided the urgency of dropsical or other concomitant evils demands such medication. This is a serious and perplexing question often presented to the physician, and which he alone can answer in individual cases. The step should be cautiously resolved upon and judiciously taken.

Dr. Bright's recommendation of digitalis and cream of tartar, given together, still finds most favour with practitioners. Ten or fifteen minims of tincture of digitalis in an ounce of cinnamon-water, or two to six drachms of the infusion in the same vehicle, are the preferable modes of administration. Three doses daily of cream of tartar (one to two drachms each), in five or six ounces of water, is advantageously given. If it purge, there can be but little objection, unless spontaneous diarrhoea exist, when the difficulty must be met as it best can. (Watson. Johnson.)

The chemical or depurating diuretics, generally, are advocated by Dr. Bird, as remarked above; and much of the benefit derived by patients under the forced exercise and micturition at watering-places is also to be referred to the fact that much solid excrementitious matter is washed away by the copious diuresis. But in chronic nephritic cases, artificial diuresis requires the most cautious trial, and its degree and effects must be closely watched. If borne, it may be readily maintained by small, repeated doses of whatever diuretic is found safest and of kindest action. A few minims of tincture of digitalis, daily, may effect the purpose.

¹ Johnson.

Christison has highly recommended the *local* application of diuretic medicines. A strong infusion of digitalis (one ounce of powdered leaves to twenty ounces of boiling water) is to be constantly kept on the abdomen, by means of spongio-piline. Whilst, as yet, the successes have not equalled the failures, it is believed that diuretic action is often thus very surely induced, in cases where similar internal medication has wholly failed, and where purgatives, likewise, have been inefficient.

Notwithstanding that diuretics have been condemned by the best authorities, except when entirely unavoidable, there seems an inclination on the part of some practitioners to again resort to them more freely. The state of renal degeneration, however, in spite of the occasional harmlessness of, and even benefit from, their use, is one which, from all analogy and plain reasoning, is likely often to be very seriously aggravated by powerful artificial diuresis.¹ It is true that many instances of obstinate renal dropsy will demand their employment at all hazards. In the *Medical Times and Gazette*, July 7, 1855, Dr. Burrows, referring to the tartrate of potash as a favourite remedy with Dr. Latham, took occasion to say, clinically, that there is a tendency with physicians to return to the old practice of giving diuretics, as affording the most decided relief to patients suffering from renal dropsy. He adds that his own experience leads him to the belief that the kidneys not only obey, but bear diuretics well, and that "no inconveniences are produced." In the particular case to which Dr. Burrows was referring, the dropsy was chronic, the urine very albuminous, and the disease did not depend in any degree on cardiac complication. His prescription was: R.—Potassæ tartratis, ʒss; Spiritûs ætheris nitrici, ʒss; Aquæ pimentæ, ʒj. Fiat haustus, ter in die sumendus. Dr. Todd speaks highly of cream of tartar, when renal congestion is relieved, and mentions benzoate of ammonia favourably.

We observe in *Braithwaite's Retrospect*, part 32, p. 106, which also quotes the above remarks, the recommendation, by Dr. S. J. Jeaffreson, of Leamington, England, of the tincture of asparagus, as a diuretic, or at least as assisting the action of more generally acknowledged diuretics. Believing, as we do from general observation, that a direct diuretic quality is possessed by asparagus when taken as food, the medicinal use of it as referred to seems very well

¹ See also a reference to their use in Fatty Degeneration of the Kidney, p. 116.

worthy of trial. It would probably act kindly and sufficiently in many cases of chronic renal disease demanding diuretics. Dr. J. says that the tincture possesses "the advantage of being capable of combination," so far as he is aware, "with every diuretic substance in use, be it from the animal, the vegetable, or the mineral kingdom." (See also *Association Medical Journal*, May 7, 1855.)

Puncture, etc.—When distension of the limbs has become so extreme as to render it probable that the skin will burst, in which case troublesome ulceration, and even sloughing, not infrequently follows, it will be best to resort to acupuncture. A few punctures relieve the tension very decidedly, by a flow of water from the parts; they should be at the distance of two or three inches apart,¹ and made well through the skin, without too deep a plunge, which is needless. The flow of serum will decide this point.

In ascitic accumulation, the employment of the trocar is undesirable, unless there be an extreme call for it. Great suffering from dyspnoea, palpitation, etc., render it unavoidable. Occasionally, prolonged nausea or pain, resulting from pressure on the stomach and bowels, must be relieved by this means. The fact of speedy reaccumulation of the fluid is referred to by Johnson as a reason for drawing off only so much as will relieve urgent symptoms. He also mentions that the relief of pressure by ascitic fluid on the bloodvessels enables the kidneys to resume, in a measure, their secretory function, by restoring the circulation.

2. All *gastro-intestinal* disorders which may arise in connection with chronic nephritis, must be met by appropriate remedies; care being taken to avoid such as would irritate the renal apparatus. If the dietetic rules already laid down be strictly observed, much difficulty will be removed, and any necessary medicines will act better.

The quantity of food must be duly regulated, in conformity to the debility of the stomach. The common alkalies are useful in acidity of the stomach, accompanied or not by nausea and vomiting. Carbonate of soda and of magnesia in small, repeated doses, and the carbonate of potash are recommended. The *liquor potassæ carbonatis* might very well answer our purpose. When nausea is persistent, counter-irritation by the usual methods should be tried. The chloroform application, sometimes found very efficient in the

¹ Not less than an inch and a half. (Watson.)

sickness and vomiting of pregnancy, is worth trying.¹ Internally, hydrocyanic acid and creasote have been found effectual. Diarrhoea, unless excessive, should not be checked; and in the event of great exhaustion from it, the restraining means should, if possible, be gradually applied. The use of opiates is fraught with danger when the slightest cerebral disturbance exists or threatens. Plain astringents are best. A mixture of red cinchona bark, tincture of rhubarb and tincture of cinnamon, with a small amount of sulphate of morphia, is a safe, efficient, and mildly tonic astringent, which we have found very serviceable in many instances where similar action was required. It would seem unobjectionable in cases of this disease, provided the small opiate were permissible, as it might often be.

3. When *pneumonia* or *pleurisy* complicates the affection, we have a difficult task, especially if the attack be severe and the patient much enfeebled. General bleeding is clearly inadmissible; common counter-irritants may be used, and, if unavoidable, leeching, near the apparent site of the inflammation. Unless in very sthenic cases, antimony should be avoided as being too depressant, although it is occasionally indispensable. Ipecacuanha and salines are advised. Stimulating expectorants are sometimes demanded, and possibly general stimulation, in the typhoidal type of pulmonary disease. Dr. Johnson advises aromatic spirit of ammonia in camphor-mixture, and small, frequent doses of the sesquicarbonate of ammonia; also, tincture of squill. Sanguinaria, in the form of tincture and syrup, combined, with the addition of tolu balsam as a vehicle, might appropriately be tried. In cases where analogous means have been demanded, we have found it extremely beneficial.

4. In *peritonitis* supervening upon renal inflammation, the same caution as to active depletion must be observed. Local measures are our main reliance, and must be sedulously carried out.

5. Should *chronic rheumatism* accompany, it is probable that much will be effected towards its removal by those means used to combat the main disease. Hot baths, both of air and water, with counter-irritation and anodyne liniments, are employed with advantage. Opiates, and, we think, Dover's powder, may be very serviceable, unless directly contra-indicated.

6. When the cerebral functions are disturbed, or decided disease

¹ The writer has had repeated proof of its efficacy.

within the cranium appears, the treatment differs scarcely at all, whether the nephritis be acute or chronic. In the latter case, however, treatment is likely to be of less avail, since, when such symptoms supervene upon chronic nephritis, we have every reason to suppose very extensive disorganization of the kidneys. Derivative bleeding, properly so called, is most effective when headache, delirium, coma, or convulsions are present. The good results of cupping over the loins are often surprising. Purgation should be thorough, with a similar derivative intent; and drugs which quickly produce large evacuations should be used—elaterium, colocynth, even croton oil. Dr. Johnson, whilst admitting the occasional propriety of this treatment, refers to the decided opinions of Drs. Watson¹ and Todd² against active depletion. The former, as has been mentioned, believes that coma may arise almost wholly from a weak, watery blood; and the latter considers such a state of the blood highly favourable to the full toxic action of urea on the brain. In consonance with his views as to the essential cause of uræmic poisoning (see page 61, *ante*), Frerichs advises the use of chlorine and vegetable acids, so that, by their meeting the ammonia in the blood, an innocent compound may be formed. He also recommends benzoic acid in large doses, vinegar lotions, and enemata.³ If the secretion of urine be very scanty, and uræmic intoxication threaten, the mineral waters of Selters and Vichy are advised. As yet, there has been but little opportunity of fairly testing this treatment. The very first warning of cerebral disorder is the only time affording a reasonable chance for remedies, and not a moment must be lost. A slight drowsiness, even, for a day or two, may be considered decidedly premonitory. Here there is little chance of over-treating the patient.

7. In no affection could *valvular disease of the heart* be a more disastrous concomitant. Yet, although in itself liable to constant aggravation, much may be done to relieve, and to put off the evil day. This complication, when urgent, will generally baffle the most skilful hand. All the means depuratory of the blood, and which assist the kidneys in their task, are preventives of the extension of the diseased condition. If the pericardium become inflamed, local bleeding and counter-irritants are indicated.

¹ Practice of Medicine.

² Lumleian Lectures on Delirium and Coma, Med. Gaz., 1850.

³ Dr. Braun.

The primary cause of the disease being impeded circulation, from some poisoning of the blood, we are prepared to recognize *hypertrophy of the muscular substance of the heart as favourable to recovery*. It is true that, if excessive, other mischief would probably ensue; but, so imperative is the demand for aid in preventing stagnation of the circulation, that Johnson directly advises the maintenance of this condition of the cardiac walls, by nutritious food, tonics, etc. Iron, he thinks, is most serviceable, not only by nourishing the heart with richer blood, but, after a time, by lessening its labour, and adapting the blood for circulation through the capillaries.

8. *Cirrhosis of the liver*, so unfavourable in itself, must be combated by nearly the same means employed against the renal difficulty. Ascites will, in all probability, be more rapid in its development, and more extreme in degree; and *paracentesis abdominis* will here, if at all, be required. Local pain, or fulness in the hepatic region, may yield to leeching, cupping, or blistering. Avoid cantharides.

In treating any of the complications, or the secondary affections, it must be remembered that the renal disease is anterior, still existent, probably aggravated—surely not to be lost sight of—either in the way of neglecting its medication, or by meeting other symptoms by remedies which would increase its extent or severity. Cognizance, moreover, should be taken of the mutual relation between the secondary affections themselves. This is well designated as a guiding principle in pathology, when managing such cases; and the danger of treating symptoms derived from a distant organ, as merely local manifestations, is pertinently illustrated by Johnson, when referring to the relief afforded in convulsions and coma, by local means to the *renal* region.

II. WAXY DEGENERATION OF THE KIDNEY.

There are two forms of this affection, the acute and the chronic. Johnson has remarked the occurrence of waxy tube-casts in acute nephritis, but although very frequent, they are but few in number. His cases all recovered. No thorough pathological deductions are therefore possible in regard to them. From his observations, we may conclude that when the disease is fatal, the tubes or many of

them will be found choked with waxy material. From the fact that the waxy casts are of the entire diameter of the tubes, it is concluded that the epithelial lining of the latter is removed during the morbid action. Johnson believes in the possibility of its reformation, and the consequent restoration of secretory action.

Acute Form.—In a case of very unfavourable augury, at first, there having been general dropsy after prolonged intemperance, with albuminous and sometimes bloody urine, there were "numerous large waxy casts," without any shedding of renal epithelium, and "complete recovery" followed.

Wherever an unorganized material fills the tubes, the epithelium being destroyed, it is natural to apprehend a worse result than in slight desquamative disease, and this on physiological grounds. In the acute case above referred to, whilst the hæmorrhage was a relief to the congested Malpighian vessels, it was considered a decided evidence of impeded circulation. Also, there could have been no chronic disease of the renal structures, as in that case the almost constant thickening of the vessels prevents rupture and exudation of blood. The hæmaturia, here, was consequently considered a favourable sign.

Chronic Form.—Whilst waxy tubular deposits may be often observed in connection with acute desquamative nephritis, a true chronic waxy degeneration may take place, wholly without such association.

Morbid Appearances.—In one such case following scarlatina, the kidneys were found enlarged. One, minutely examined, was, in addition to the increase of size (weight, 9 ounces), waxy in its appearance; yellowish; the lobular markings effaced; a few vessels only ramifying on the capsular surface. There was congestion of the medullary cones, which were dark red. Microscopically, no healthy tubes were found; wax-like material filled most of them; and such had lost their epithelium. Pressure caused exudation of the waxy matter in the form of the casts often observed in the urine. A few of the tubes contained an excess of "rather small epithelial cells;" the latter were also separately observed. "A very few tubes contained oil." An opaque and thickened condition of the Malpighian capillaries, such as has been noted in describing their appearance in chronic desquamative nephritis, was remarked.

Scrofulous enlargement of the liver (so termed by Budd) has been observed in connection with waxy degeneration of the kidneys.

Acid and very albuminous urine, with a specific gravity of 1.018; clear when first passed, but turbid after twelve hours standing, with one large, and one small waxy cast, one granular cast, no renal epithelium and no oil, were noted in a case under Dr. Budd's care. The termination was fatal. The kidneys were large; weight 10 ounces, the lobular markings obliterated; very little vascularity, generally of the same external aspect as the liver, which was of a pale yellow colour, pitted on pressure, and was slightly atrophied. When cut, it was "bacony," as it is sometimes termed, with deposit of an unorganized material, which, or an analogous one, filled certain of the renal tubes. On pressure, this latter material exuded in the form of waxy casts, and the tubes containing it were found denuded of their epithelial lining. Elsewhere, little appearance of tube-structure remained, owing, it was thought, to the deposition of waxy matter into atrophied tubes. A granular condition of the capsular surface of the kidney was referred to the latter circumstance. The Malpighian bodies were anæmic in appearance; the capillaries much thickened, whilst the arterial walls were not so.

It has been thought that these well-detailed pathological appearances would clearly indicate the nature of the disease, and they are therefore fully presented. Blood-poisoning, its action on the renal apparatus; changes and destruction of the secreting, tubular surface; deposition of new material—were the primary morbid processes. As a consequence, faulty excretion, obstructed circulation and exudation of albumen followed; and finally, alteration of the capillary walls took place. When the tubes are destroyed, atrophy naturally succeeds.

The *characteristics of the urine* are nearly constant. With a few unimportant differences, they are as above described. When first passed, the excretion is of the colour of light sherry wine; and contain "small cells or abortive germs of cells," entangled with the waxy casts, are seen. When the affection is acute, the casts are readily thrown off; but, in the chronic form, the opposite is true. Their adherence to the basement-membrane, and the final wasting of the conglomerated mass above alluded to, occur. This is well termed a "wreck of organization." Contrary to what takes place in chronic desquamative nephritis, where the basement-membrane is left bare—this form of disease affords no ground for the formation of cysts. Therefore, when the waxy degeneration is primary, and unconnected with the desquamative action, no denuded tubes are

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cones have a "pale pinkish colour." The lobular divisions grow more and more indistinct with the advance of the disease, and at last disappear. A little vascularity lingers here and there, in patches, over the capsular surface. Occasionally, true ecchymoses are observed on the surface or even in the substance of the renal cortex. The capsule proper is easily removed; no granulations are usually seen beneath it. There are no inequalities except where the cortical substance is elevated in portions, where the lobar divisions existed.

Microscopic Appearances.—Opacity of the convoluted tubes, with a coarse, granular aspect of the epithelium; the latter is of the natural width, sometimes of a yellowish-brown colour. (Jones and Sieveking.) The epithelial cells seem unusually full of solid matter; "the central axis of the tubes is lighter than the margins," and constitutes a free canal with no desquamated epithelium within it, but sometimes a portion of the "white coagulable material which forms the small waxy casts." There is sometimes effused blood in the tubes, when the rarely-occurring hæmorrhagic spots are seen in the cortical substance. No great change of structure takes place in the straight tubes.

Bloodvessels.—Drs. Jones and Sieveking, who in their description notice this form of disease¹ with the others already examined, and with Bright's disease, under the comprehensive term of "Degenerative² Disease of the Kidney," refer to increased opacity of the Malpighian capillaries from a deposit of coagulated fibrin. This is often abundant, and oil is found mixed with it, with the result of considerably dilating the capsule. In certain cases they remark (as do other writers) a compression of the Malpighian tuft into a small space at the bottom of the capsule, and its consequent shrinking and atrophy.³ The changes observed in the above named bloodvessels are closely analogous to those described under the head of chronic desquamative nephritis. First, congestion, without thickening; but gradually the latter process is declared. They then appear like

¹ These writers refer to Dr. Johnson's *Non-Desquamative Disease of the Kidney* as being denoted by him *Non-Desquamative Nephritis*; a designation which, if we correctly understand his account, he does not intend to apply. Does he not mean it to be considered a degenerative affection, and not a *nephritis proper*?

² If a more convenient, certainly not so clear an arrangement as Johnson's; they generally agree with him.

³ Johnson says, the oil and the compressed, atrophied tuft are less observable in this affection than in chronic desquamative nephritis.

firm, whitish, waxy coils—the coats being rendered transparent by the application of acetic acid, and a single row of blood-corpuscles may be observed through them, although previously they may have appeared destitute of blood.

In certain of the Malpighian vessels, however, circulation seems wholly at an end, and no blood-corpuscles are found.

Hypertrophy of the muscular coats of the arteries is observed in this affection, as in chronic desquamative nephritis, but not so constantly.

It is pronounced to be in direct proportion to the continuance of the disease, and inversely so to the general increase of bulk of the organ.

The interlobular capillaries are found much in the same state as in chronic desquamative nephritis; when they can be injected, no thickening is noticed. A majority of them are said to be atrophied and obliterated. This condition is shown by the partial or entire loss of "hexagonal, lobular divisions" seen on the capsular surface, when healthy. The coats of these vessels show no thickening under the microscope. Coagula are sometimes found in the larger venous branches.

NATURE OF THE DISEASE.

Explanation of the Increase of Bulk of the Kidneys.—This is more frequent than its opposite, and different causes contribute to its production. In addition to a *quasi* natural increase or hypertrophy of the renal tissues, by reason of increased action, called for by the lack of that relief afforded in other forms of disease by desquamation, the foreign matters not thrown off, accumulate, and finally act as incentives to morbid gland-growth. Dr. Johnson thinks that there is no actual production of new tubes—nor, commonly, enlargement of the diameter of those existing, as elements in the increase of size observed in the organs; but that the remaining tubes very probably grow longer, and become more convoluted. Without being able fairly to demonstrate this by dissection, he considers it a plausible argument by exclusion, there being no other observable condition adequate to the production of the actual enlargement of the kidney. The fibrous matrix surrounding the tubes would prevent much increase of their diameter, to which there is a tendency in non-desquamative disease.

Jones and Sieveking mention the presence of cysts, microscopi-

cally discovered in the cortical portion of the kidney affected with non-desquamative disease; this, they hint, may add something to the size of the organs, although, "in the more atrophied condition," they assert a greater frequency of them. The impediment to the intertubular capillary circulation is attributed to the slow performance of the functions of the gland-cells. Renal excrement, in gradually increasing quantity, is thus kept in the blood. Serum next exudes from the congested Malpighian capillaries, and the various changes which have been mentioned, take place in the bloodvessels.

Hypertrophy of renal tissue is not a constant result of this non-desquamative affection. In very rapid and fatal cases, there would be no time for such increase; an essential condition, as proved by many cases. And again, where the renal structure is rapidly and extensively invaded, much destruction of tissue is effected by blocking, compressing, and obliterating the tubes and vessels. True atrophy may take place, and both the size and weight of the kidneys be diminished. There seems a gradual lessening, and sometimes a cessation of circulation through the organs. The atrophied state is pronounced very rare, in contradistinction to chronic desquamative nephritis, in which it is "the rule." The drain of albumen from the blood in this class of cases, and in similar ones, is excessive, and its effect may be easily imagined. Frerichs notes the daily abstraction as from 54 to 360 grains. That a great departure from a healthy state, both of the organs chiefly implicated, and of the general system, takes place, is only too evident. The low specific gravity of the urine, its paleness, altered smell, and the striking diminution of all its solid constituents, at once declare the serious amount of disorder existing.¹

The waxy degeneration, non-desquamative disease and fatty degeneration of the kidneys, as has already been mentioned, have many phenomena in common. Reference to this will again be made in connection with the next subject—Fatty Degeneration. The present disorder is occasionally initiatory to that more unpromising affection. Certain observers consider it as a stage of Bright's disease. It seems a more precise and clear arrangement to describe it separately.

¹ Rayer.

IV. FATTY DEGENERATION OF THE KIDNEY.

General Remarks.—The simplest method of considering the pathology of this disease, is that which divides it into *two forms* only.

Whilst Dr. Bright proposed three divisions alone, others have complicated the subject by making six,¹ and even eight different forms. There are those, on the other hand, who mingle their description of the two preceding forms with the present; a conglomeration which, it seems to us, tends to confuse rather than elucidate. If we consider under the present head, only that condition properly designated *fatty degeneration*, we deal with a single subject, and need only collaterally refer to its connection with antecedent renal affections.

Fatty degeneration may follow either of the foregoing maladies, but it also occurs independently of them. The non-desquamative form seems to have closer affinities with it than does either of the others; and the occurrence of oil-globules, seen in the whitish sediment which appears after an indefinite period, containing also small waxy casts, is the first and a most unpromising sign of commencing fatty degeneration. These oily casts and cells may appear very variably as to size and number, for some time; subsiding for a while, and being as it were aggravated again by imprudent exposures. If acute desquamative nephritis be etiologically connected with the present disease, an intermediate, non-desquamative state commonly intervenes. Cessation of the epithelial desquamation, with transparency of the urine, which, however, remains very albuminous, takes place. Next, the waxy material, in the form of small casts, and at last the oily admixture ensues. It has been noticed that oil-globules have appeared before the desquamation has ceased,² and a gradual increase of them is observed as the desquamation diminishes.

MORBID ANATOMY.

A. HYPERTROPHIED FAT KIDNEY.—*General Appearances.*—*External Aspect of the Kidneys.*—In that form of the disease characterized by an *enlarged* kidney, whether “mottled,” or “white,” we of course have additional weight, corresponding to the increase of size. The cortex is either wholly pale, or spotted with vascularity, some-

¹ Rayer.² Johnson.

times marked with true hæmorrhagic deposits. The general description of the organs is closely analogous to, and often identical with, that already given of them in non-desquamative disease. The colour of the medullary cones is usually that observed in health, and their vascularity is neither increased nor diminished. The organs not infrequently have a doughy feel; and their consistence is softer than natural.

Microscopical Appearances.—Larger oil-globules are found in this form of the disease, *mottled fat*, than in the *granular fat* kidney. It has been remarked that a condition analogous to that of the liver affected with fatty degeneration, is observable in these cases;¹ that is, the detached epithelial cells, filled with oil, closely resemble the hepatic cells in the same state. No oil, generally, is found in the intertubular tissue, nor in the Malpighian bodies. The fatty matter seems to be deposited solely in the lining epithelium of the tubes secretory of the solid urinary constituents; the tubuli of the medullary cones show no deposition, unless it be *debris* coming from the convoluted tubes, the latter being nearly always, and equally, filled with oil. In certain tubes, it is found that oil has wholly taken the place of epithelial cells—the latter being atrophied or destroyed. Usually, indeed, only a single layer of epithelium remains, the oil being alone carried out of them by rupture of the cells, or by the escape of a fibrinous plug previously impacted.

Bloodvessels.—The appearances are almost precisely those described under the previous forms of chronic renal disorder—the spots of hæmorrhagic extravasation are due to effusion of blood into the convoluted tubes.

Proportion of the Fatty Matter found.—In the large, mottled, fat kidney, the amount of oil or fat is much greater than in the opposite form. In one case narrated, more than one-fourth of the solid matter composing the cortical portion of the kidney was fat.² In another, it was a little above one-sixth of the solids.

B. ATROPHIED FAT KIDNEY.—*External Aspect and Peculiarities.*—*Consistence, Colouration, &c.*—For these, in the main, the description of the organs as affected with chronic non-desquamative disease is referred to. Their form is often strikingly lobulated; Jones and Sieveking compare it to the foetal kidney. In addition, we have those straw-coloured or yellowish granulations, or irregular pro-

¹ Johnson, p. 369

² Ibid., p. 390.

minences, which have given one name to the disease, that adopted by Dr. Christison.¹ These are seen scattered throughout the cortical substance, and this portion is the most atrophied; the medullary cones being less affected. The granulations have been compared to the atheromatous specks or plates in arteries. Chemical and

Fig. 20.



Drawing of atrophied kidney.

Fig. 21.



Cortical part of a granular kidney, containing very numerous microscopic cysts. The tubes are very much degenerated and broken up. Two Malpighian bodies are shown.

microscopic examination decides them to be *fatty* in their nature. Frerichs remarks the consolidation of tissue; the organs acquire "a leathery toughness." This increases, as the atrophy progresses. The kidney is not so pale as in the other variety; often it is of a dark colour, as if from passive hyperæmia. (Jones and Sieveking.) The capsule is usually very adherent, but when thickened, a layer of it may be peeled off, leaving an apparently smooth surface behind.

Microscopy, &c.—The microscope also discovers nearly the same characteristics in the tubes, as already given for non-desquamative disease. The renal tissue is found extensively degenerated, sometimes only granular *débris* remaining; often all traces of the tubes are gone, and a shapeless mass alone is left. The tubes seem to have some tendency to become dilated, possibly from a thicker and more granular condition of the contained epithelium, which irregularly enlarges their calibre. This is especially remarked in less

¹ Granular degeneration.

advanced stages, and causes an appearance of constriction by the meshes of the surrounding fibrous tissue. Referring to the contracted form of Bright's kidney, Dr. Barlow (*op. cit.*, p. 481) says that "there is no deposit in the tubes, but the degeneration consists of a large increase of fibrous tissue, which, by its subsequent contraction, strangulates and atrophies the secreting cells, much as in advanced cirrhosis of the liver." Dr. Johnson (*Brit. and For. Med.-Chir. Review*, April, 1856), in a review of Dr. B.'s book, while he declares his doubt as to the explanation of cirrhosis, wholly denies the correctness of the other portion of this sentence. He refers to the manifest existence of deposit in the tubes, proved both microscopically, and also by tube-casts seen during life. He reiterates his assertions that "the primary change in the kidney affected with this form of disease is a desquamation and crumbling of the gland-cells which line the tubes. The disintegrated cells appear in the urine in the form of granular tube-casts. The tubes being thus deprived of their epithelial lining, waste, and at length many disappear; meanwhile the meshes of the matrix which contain the atrophied tubes, become narrowed, and their fibres appear relatively thicker; hence the notion that 'a large increase of fibrous tissue' is the essence of the disease." This appears a much more reasonable explanation of the facts, and it is, moreover, entirely susceptible of demonstration. The accuracy of Dr. Johnson's experimental research is evinced not only by the general concurrence of other skilful physicians in the most of his conclusions, but by the ratification of them, at so recent a date, by himself.¹

¹ Kölliker remarks (*Human Histology*, Syd. Soc. Ed., vol. ii. pp. 210-11), that "in inflammations, hæmorrhages, exudations, fatty kidney, we find *pus-corpuscles*, *oil-drops*, *blood-globules*, blood, and *fibrinous coagula*, moulded in the *tubuli uriniferi*, in the form of cylindrical casts, and epithelium from the tubuli, isolated or in continuous strings or tubes." Also, "the occurrence of albumen, fibrin and fat, within the *tubuli uriniferi*, is, in my opinion, easily explained, upon the supposition that in such cases the circulation is obstructed, and an increased secretion of the elements of the blood takes place in the Malpighian bodies and *tubuli uriniferi*, in consequence of which, the epithelium of those parts, which, as is well known, is found in these cases in considerable quantity in the urine, is washed away, whence, of course, any further hindrance to the continued passage of the above substances is removed." He thinks it "conceivable that fibrin may permeate through the epithelium, just as much as in the respiratory organs, upon their mucous membrane, though the delicate epithelium would probably be affected." It also appears to him "that the frequent occurrence of small quantities of albuminous matter in the urine often depends simply upon local deficiencies of the epithelium, caused in one way or the other." (*Loc. cit.*, p. 212.)

Condition of the Tubes—Amount of Fatty Matter, &c.—It requires some time for the tubes to become changed by the tendency to fatty deposit within the epithelial cells. In a healthy kidney, we sometimes find one or two small oil-globules, but an increased size of such, and their aggregation until they fill the epithelial cells, is the strongest characteristic of this degeneration. As this process advances, the cells change—losing their regular outline and position

Fig. 22.



Fibrinous deposits in a granular kidney. The situation of the patch is marked by the irregular outline, which was a deep red. (From JONES and SIEVEKING.)

in a single layer on the basement-membrane. From being angular and clearly defined, they become globular or oval; their walls are transparent and of similar texture throughout. When crowded with oil-globules, they are opaque. Instead of being epithelial, they have become granular. They are likened to the cells found "in scrofulous or cancerous tumours." When one of the granulations is examined microscopically, abundant cells of the above description are seen. If a section be made with a Valentin's knife, quite a length of convoluted tube may be seen filled and blackened with the opaque, granular cells.¹ The tubes in many of the granulations have apparently sustained rupture, or else have lost their continuity by atrophy arising from cell-degeneration. It is demonstrable that the granulations are made up of tubes filled to an extreme degree with oil. Jones and Sieveking say they consist "of the infarcted convolutions of tubes, and the parts in which most traces of the

¹ Johnson.

natural structure still persist; they remain prominent, because the intervening parts have perished, and shrunk in." "The basement-membrane of the tubes" is lost, most commonly; this disagrees with the statement of Frerichs and some others, as to its supposed existence "among the atrophied tissues." The cell-degeneration, and the atrophy of the tubes, Johnson thinks may be owing to the antecedent obstruction of the capillary circulation. This author also refers to Mr. Quain's paper upon fatty degeneration of the heart, in connection chiefly with local modifications of nutrition, in support of an apparent analogy between this affection and that of the kidney, supposing the prime cause to be arterial obstruction (capillary). Alluding to the supposition that the matrix is the real seat of the fatty deposit, Johnson believes it erroneous; and to have arisen from the scattering of oil-globules over the specimen, from tubes ruptured by the instruments with which the examination is made. The adhesion of the oil-globules to the fibrous rings of the matrix might occasion the illusion. This he thinks proved by the fact that, if the tubes remain entire, no matter how full of oil, none of the latter appears about the meshes of the matrix; also, by "briskly agitating the specimen in water," any oil which sticks about the matrix is readily removed. The fibrous tissue can only be thus degenerated exceptionally.

Occasionally, oil-globules are seen in the Malpighian capillaries, but very infrequently, when compared with cases of chronic desquamative disease. Caution in not rupturing the oil filled tubes, or, if this happen, a careful washing, to establish the fact, is requisite in order to accurate observations.

The facts which prove the fatty nature of the granulations are, 1st. The peculiar and characteristic appearance of the globules under the microscope. 2dly. The complete digestion of them which ether effects. Heat is another test, especially when the granulations are small. Fusion of them is thus produced, and "large drops of grease" are formed.¹

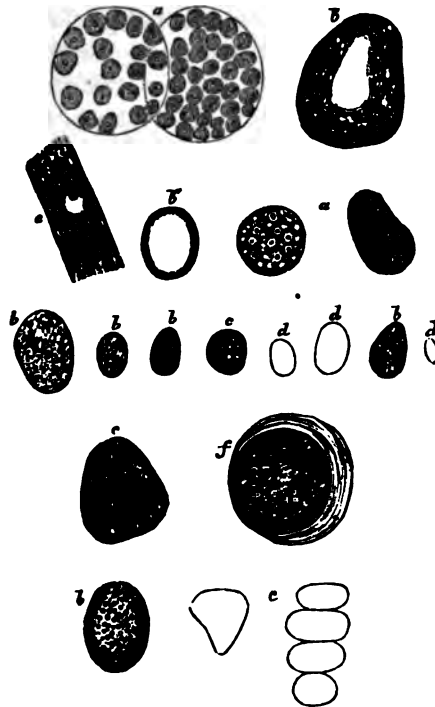
Number of Granulations—Amount of Fat, &c.—The granulations are very unequally distributed. In some kidneys they are numerous, thickly studding the cortex; again, they are very few in number. It is believed that but a small proportion of the oil can be

¹ Sometimes slices of renal tissue, apparently fatty, do not grease white paper, when they are heated upon it, whilst such treatment of fatty liver scarcely ever fails to show abundant grease.

attributed to "metamorphosis of a fibrinous or albuminous effusion into the tubes." Most of it is contained in "distinct cells," and these may be traced, "degenerate offspring" though they be, through their various stages of change, up to the gland-cells.

Kölliker (*Human Histology*, Syd. Soc. Ed., vol. ii. pp. 200-1) speaks of "the very numerous *pathological* degenerations of the *tubuli uriniferi*," such as thickening of the *membrana propria*; oil in considerable quantity in the epithelial cells (which, he remarks,

Fig. 23.



Renal cysts, and cyst-like casts. (a) Cysts containing cells. (b) (b) (b) (b) (b) Cysts containing granulous matter and nuclei; in b', the celloid contents are disposed so as to form an epithelium round a central space; in b'', the nuclei are elongated. (c, c) Cysts containing granulous and oily matter. (d, d, d) Small transparent vesicles. (e) Young cyst, diameter 1-2000th of an inch, in the remains of a tube. (f) A cyst with laminated walls. (g) Two doubtful cysts, probably casts, without distinct envelop, consisting of granulous and a little oily matter. (h) An oval fibrinous cast advanced in fatty degeneration. (i) Pale, homogeneous, fibrinous casts.

then often present a deceptive resemblance to the cells of a fatty liver, and are usually enlarged to a diameter of 0.02'''); pigment-granules, and bright yellow colloid-like masses in the epithelial

cells—the dilatation of the latter into cysts, which are 0.05—0.072" in length, and, on bursting, pour the colloid substance into the urine, and present it in the uriniferous tubuli. He has also noticed, in common with other observers, "very distinctly, in an atrophied kidney, a partition of the convoluted tubules into closed cysts, to all appearance by a connective tissue, developed between and constricting them." The structure of these is the same as that of the tubuli, and their diameter is like, or they may be found "distended into vesicles 0.01" in width." The Malpighian bodies are sometimes expanded into cysts containing a clear fluid and also a granulous matter or an admixture of oil and granulous matter (Jones and Sieveking); the atrophied *glomerulus* being often visible upon the cyst-wall.

Whilst enumerating blood, fibrin and the above colloid substance, together with concretions in the ducts of Bellini, chiefly of carbonate and phosphate of lime in the adult, and of uric-acid salts in children,¹ Kölliker says, quite in confirmation of Dr. Johnson's conclusions, and wholly in opposition to Dr. Barlow's assertion already referred to—"In the later stages of Bright's disease, many tubuli which have lost their epithelium in consequence of the exudations poured out in them, become atrophied, and ultimately disappear altogether, whilst groups of others are seen filled with a fatty, broken-up exudation, and dilated into minute nodosities (granulations—Christison)." (*Op. cit.*)

Nature of the Disease.—The intimate relation between all the forms of renal disorder hitherto examined has been alluded to. The fact that fatty degeneration is not infrequently a direct sequence upon the others should be remembered; and particularly that it often constitutes an advanced stage of the non-desquamative disease. Many celebrated observers have laboriously investigated the nature of these affections, and to no single point has their attention been more perseveringly turned than to the solution of the important question, "*What is Bright's disease?*" We must reiterate our belief in the necessity of separating the foregoing forms, in order to a clear understanding of each condition. A certain affinity belongs to the affections of any organ whatever—function being a constant quantity, that which interferes with structural integrity touches the

¹ Occurring, if not exclusively, still usually, "in children who have already expired (between the third and twentieth day after birth)." Kölliker.

normal play of the apparatus; but different morbid processes do so in unequal degrees and with varying results, whilst the general tendency is nearly or quite the same.

It has therefore been well remarked, that the term "Bright's disease" is liable to convey the idea of too positive *singleness*, and not that there is a *class* of diseases thus designated, whose pathology was first announced and explained by the distinguished physician whose name is rightly attached to them.¹

In a review of certain cases of Bright's disease, reported by Dr. Samuel Wilks, of London, Dr. Johnson very properly insists upon this distinction, and he has given altogether the clearest and most simple account of the two forms of fatty kidney, of which we are cognizant. (*Vide British and Foreign Med.-Chir. Review*, January, 1855.)

The best observers now agree with him in repudiating the doctrines inculcated by Reinhardt and Frerichs in 1850-1. They taught that renal engorgement was the first step in the affection; next, an outpouring of the products of inflammation; then, a change of these into fat, and finally, atrophy. For them, the contracted, granular kidney *has been* fatty; the large white, or the mottled fat kidney is progressing towards the condition of the former. To this it is replied that no proof exists that hyperæmia of the kidney is either causative of, or even antecedent to, the exudation-process into the *tubuli uriniferi*, the constant characteristic of the forms of nephritis previously referred to. Whilst new epithelium is undoubtedly formed in these cases, the original cells, even, being sometimes displaced by those which are puriform, these changes are now held to *precede*, not follow, engorgement or hyperæmic fulness. As previously mentioned, the impediment to the renal circulation is the first morbid step *after deterioration or poisoning of the blood*, in whatever mode that occurs; as consequences, we have occasional rupture of Malpighian capillaries, changes in the course of the arteries (*tortuosity*), and in their structure—then, the progressive march of the malady, functional perversion, structural lesion.

¹ "The term 'Bright's disease' is with more propriety to be regarded as embracing more than one disease of the kidney capable of causing albuminous urine, and accompanied by congestion or deposit. The term is only objectionable in not being sufficiently distinctive for the present state of our knowledge; but it is convenient as a generic one, and there appears no very great objection to its use on such an understanding." G. Owen Rees, on Diseases of the Kidney. London, 1850.

It will be seen that all the writers cited distinctly admit a fatty kidney, whilst disagreeing as to its pathological explanation. Reinhardt, Frerichs, Eisenmann and Mazonn, believe atrophy of the kidney to be only a later stage of the inflammatory effusion and fatty degeneration. Johnson finds no evidence that the large, heavy, fat kidney passes into the small, hard, contracted, granular one; he makes two distinct affections of them. But another remark is here necessary. Fatty granulations, in kidneys atrophied after chronic desquamative disease, are but infrequently found; so that although the two diseases are not *incompatible*, they are by no means constantly associated—and hence the necessity of considering them separately. Johnson believes the chances of fatty degeneration to be “in inverse proportion to the extent and activity of the desquamative disease.” The differences between the two forms of true fatty kidney, *i. e.*, the large white, and the small, contracted, both as respects the structural changes and many other points, are very striking. The tubes in the former are very rarely denuded of their epithelium, whilst, in the latter, it is disintegrated and swept away in the majority of cases; atrophy of the tubes resulting. In the large white kidney, the tubuli are filled by fibrinous or albuminous deposit, or else complete fatty degeneration invades the gland-cells. Far more albumen is poured out by the large, than by the small, hard kidney; glandular tissue is often in excess in the former, and no decrease observable in the number and capacity of the blood-vessels. The opposite is true of the granular fat kidney, *viz.*, shrinking of the tubuli, obstruction of the arteries and capillaries, with oil-globules adherent to them. Finally, the scanty supply of blood necessarily entering an organ in this state, precludes an abundant secretion of albumen.

Fatty degeneration, then, presents itself in *two* forms; one affords, constantly, large quantities of fatty matter when the disease is well established; the other, smaller, but distinct depositions of the same nature. In one, the kidney is increased in size and weight—in the other, these are lessened—more particularly the size. In the large white, or in the mottled, kidney, the tubes are finally filled with oil or other foreign matter, and rather tend to dilatation than to atrophy; in the granular, contracted kidney, they most frequently lose their epithelial lining, and waste. In opposition to the statements of Frerichs, Dr. Wilks does not allow that these two different conditions of the kidney are only different stages of the same affection,

and, symptomatically, he points out a striking difference, viz., that in small, contracted kidney, no indications of acute dropsy exist, nor any of inflammatory disease; whereas the *opposite* is true of the large white kidney. (*Guy's Hospital Reports*; second series, vol. viii.)¹

Johnson endorses this statement as correct in a great majority of cases, but thinks it somewhat too broadly expressed. He refers to the well-known facts of the insidious nature of the large white and mottled fat kidney, their existence, and even considerable advance, without inflammatory symptoms or dropsical effusion. He has, moreover, seen cases where he had no doubt of the granular contracted kidney having commenced with acute dropsy, the patient having previously been healthy. (*Loc. cit.*)

The urine, it should be remembered, is scanty in the large white kidney, when compared with the healthy secretion, and is very albuminous; on the contrary, the small granular kidney is generally accompanied by a much more plentiful flow, and the albumen is less.² Dropsy being generally occurrent in a proportion inverse to the amount of urine, we have a cogent reason, in the above state of things, for its frequency in the large white, fatty kidney, when contrasted with its opposite. The rapidly fatal termination of cases of granular contracted kidney, with intercurrent dropsy, after sudden decrease of the urine, is adduced by Johnson in further proof of the above facts.

Jones and Sieveking object to the theory of Frerichs as too mechanical, and not sufficiently recognizant of the large number of recoveries occurring after attacks of an acute, hyperæmic nature. They also refer to the constantly observed latency of serious degenerative disease; this is in opposition to an explanation which refers the origin of the malady to active phlogosis and engorged vessels—engorged, not by *stasis*, but by inflammation. His theory does not, moreover, explain the differences, so notable, between simple nephritis and Bright's disease; they are satisfied with Johnson's deductions, as being "most consonant with sound pathology." The accumulation of epithelium within the tubuli does not indicate

¹ Jones and Sieveking "strongly incline" to recognize them as two distinct varieties. (*Op. cit.*)

² Dr. Woodward, of Philadelphia, has often seen fatty kidney unaccompanied by albumen in the urine. In twelve cases, albumen was only twice or thrice present. (*N. A. Med.-Chir. Rev.*, March, 1858.)

greater activity in throwing off morbid material, but only that, being unhealthily nourished, they do not disintegrate, in the secreting act, as they normally should. (*Loc. cit.*, p. 559.) The oily cell-deposit indicates a low vitality in the cells; the normal composition of the formative plasma is disturbed. The same faulty nutrition occasions the destruction of the basement-membrane. Recognizing the deposition of oil in the changing epithelium, these authors hold it to be "accidental, and not in any way essentially modifying the morbid state." This may be true, or nearly so; still, *any addition* to a morbid condition is worth noting; and surely, were the oil not there, the organ would be pronounced in a better state than when containing it, especially in large quantity.

The same writers believe that a certain affinity with scrofulous and tuberculous states may be predicated of the large fatty kidney. This has been referred to by others. The contracted form of degenerated kidney seems allied to the changes remarked in "cirrhosis of the liver, and contraction and thickening of the cardiac valves." Dr. Barlow announces the opinion that fatty degeneration "is rather an effect and a sign of previous disease, than any way concerned in the etiology of the disease itself" (*op. cit.*, p. 482), and he adduces the fact that both "the inflammatory exudation into the tubes, in the large white kidney, may become fatty," and still these two conditions "may occur without any fatty deposit whatever," as confirmatory of his views. Whilst many cases may be found more or less decidedly supporting this opinion, that heretofore enunciated by Johnson, Wilks, and others, is far more clear and tenable. With them, too, the fatty change is often only an effect, and probably never fairly a cause, if sometimes a first, or sole condition, of the organs; still, it justly constitutes a phase of renal disease *by itself*, and is properly so described. Capable of recognition during life by the microscope, diagnosis has never had more palpable aid from mechanical sources, nor prognosis more reliable foundations, than in the subdivisions recognized by Johnson. The fatty state can perhaps never be properly called the primary cause of the renal degeneration; it constitutes, indeed, the degeneration itself; the vitiated state of the blood, by modifying the secretory cells, is the efficient agent of the condition; the more remote causes have been already referred to. We think Dr. Johnson has much reason, on several points, to condemn the loose manner in which

Dr. Barlow has written upon the pathology of Bright's disease, whilst he commends his remarks upon *treatment*, very justly.

Fatty degeneration, then, may be properly looked upon as a special and distinct form of renal disease, sometimes following the previously considered forms; best divided, for practical purposes, into two kinds, "not specifically distinct from each other," any more than are the other phases of disorder which have been conglomerated, of late, under the title of "Bright's disease;" their presence recognized with nearly equal precision before, as after death; their fatality differing; their treatment not essentially varying.

Whilst no great harm can result from comprising the three forms of renal disorder previously considered, together with fatty degeneration, under the title "Bright's disease," or referring to them under the designations degenerative disease, and subacute inflammation of the kidney; the separation of the affections is the more distinct and available way of examining them—keeping in view their analogies, whilst their differences are recognized, and not making them merely stages of one disease. Thus we are able both to distinguish an inflammatory phase of the general malady, and yet put the seal of an accurate diagnosis and prognosis upon the various morbid products observed. "We must distinguish the granular form of fat kidney, which may be a consequence of a previous inflammatory¹ stage, from the mottled form of the disease, which is analogous to ordinary fatty degeneration of the liver, and not a consequence of inflammation."² The small, contracted kidney, although an occasional consequence of an acute inflammatory attack, is more commonly the result of a disease which is chronic from the commencement, and never, as we believe, a consequence or a later stage of either of the forms of fatty degeneration." (Johnson, *loc. cit.*, p. 63.)

That the large fat kidney has no tendency to pass into the contracted granular one, can be proved by examples. A man ill for four years, first had dropsy in the autumn of 1848; the urine, highly albuminous, showed oily casts and cells in November, 1849, the same in Jan. 1850, and also in Dec. 1851. Subsequently no note was taken of the urine. Death in March, 1852. *Necroscopy*—One kidney was destroyed by calculus impacted in the ureter; the

¹ But not a true *nephritis*.

² Johnson, in Brit. For. Med.-Chir. Rev., Jan. 1853.

other, more than double its natural size and weight, was properly a granular fat kidney, but there was no denudation, nor atrophy of the tubes. Another case, nine months under observation, presented oily casts and cells, from the first, throughout the disease. The kidneys were found much enlarged, in a state of fatty degeneration, but there was no sign of the atrophic process. (*Loc. cit. sup.*, p. 62.) There are also many cases where, on *post-mortem* inspection, the kidneys are found in the chronic stage of degeneration, characterized by denuded and atrophied tubes, yet without antecedent dropsy, or other alarming symptom. In connection with this fact, another must be remarked, viz., that granular fat kidney "never destroys life, without the previous occurrence of dropsy, which is usually one of the most prominent and distressing symptoms."¹

The mottled kidney is found in cats and dogs, as well as in human beings, without concurrent albuminous urine; also after death from diabetes; and, again, in dropsical cases, with albuminous and oily urine, this peculiar form of degeneration has been alone discovered. Fatty degeneration is, then, *partial* in the granular form, *general* in the tubuli of the renal cortex in the enlarged mottled kidney. Albuminuria and a certain amount of inflammation precede the former, but the kidneys may be extensively fatty without albuminous urine, when the latter form obtains. Dr. Barlow pronounces the mottled kidney a term nearly obsolete, at present, amongst pathological anatomists. If this be so, there seems hardly any sufficient ground for it, as the aspect of the organs so often fully justifies the term. We may here allude to the fact that the large white kidney, as it is termed, is but infrequently seen in this country, in comparison with the small contracted kidney. This will hardly, we presume, ostracize the term. Dr. Barlow thinks the mottled kidney only "a state of transition from the first to the second form of the disease" as subdivided by him (*six forms*); his first being the large hyperæmic kidney in a state of "bronchitis," as he designates it. The second, the large white kidney, "generally as much as double the natural size and weight."

In *L'Union Médicale* for May, 1855, Becquerel has divided Bright's disease into four varieties, viz.: Hyperæmic state of the cortical portion and Malpighian bodies, there being effusion of blood or albumen into the *tubuli uriniferi*. Secondly. Fatty degeneration

¹ Johnson.

of the epithelial cells, their subsequent destruction, and either atrophy, or entire disappearance of the tubes, or their infarction with fibrin. He also believes that fatty deposit may be made between the tubes, in conjunction or not with albumen; a statement doubted by good observers. Thirdly. That the so-called granulations are composed of albumino-fibrinous matter; that this is found in the *tubuli uriniferi*, the Malpighian bodies, and in the intervening tissue; also that it is organizable. Fourthly. That there is an infiltration of the urinary cells with proteine molecules, and that the cells which fill out the urinary canals are enlarged. He also states that these forms exist both in combination, and separately. (Noticed in *Brit. and For. Med.-Chir. Rev.*, Oct. 1856.)

Prognosis in Cases of Waxy Degeneration, Non-Desquamative Disease, and Fatty Degeneration.—There is just that connection existing between these forms of renal disease which makes it advisable to notice their prognostic elements together. Whilst as separate conditions they are most properly described by themselves, they are, in some sense, though not uniformly, dependent on each other, and occasionally an actual sequence is distinctly traceable in the morbid processes.

We need scarcely repeat that the etiological influences are nearly the same, both in their direct agency and prognostic value, in these affections of the kidney as in those previously considered.

Differences in individuals, moreover, as to constitution, ability to avoid exposure, habits of self-control, and all similar elements, should be well considered, as bearing very much upon the probable termination of the disease.

It is well, in these days of extended and varied minute examination, not to neglect the deductions which may be drawn from other sources. Whilst we accord all the merit due to the extraordinary power of revelation afforded us by the microscope and chemistry, the *generalia* must still receive our diligent attention. Every point in the previous history of the patient; the peculiarities and experiences, both hygienic and remedial, and all predispositions, hereditary or acquired, must be recognized and carefully weighed, when diagnostic and prognostic decisions are called for.

When an opinion is to be formed at an early stage, the difficulty, as in nearly every malady, will of course be greater; but the *actual condition* of the patient, at whatever epoch of disease, must be most

critically examined. Not alone the physical signs, but the mental states, are of great importance—a view of the case must be taken from every possible stand-point.

The forms of degenerative disease now under consideration are by general consent pronounced more hazardous than simple nephritis. The very name of Bright's disease is significant of grave peril. Generally, too, the constitution is in a weakened state, and there is much to struggle against, every way. Of course the chances of recovery are directly in proportion to the comfort which patients are able to secure; to immunity from the demands of toil, bodily or mental; to a wish and will to recover; and to the cheerfulness maintained by the individual and those about him. All concurrent taint of constitution is of ill omen. Scrofula; previous renal disorders; exhausting discharges; deficient and improper food; habitual loss of sleep; inveterate intemperance; not only induce the complaint, but warrant an unfavourable prognosis.

The morbid condition of the organs, especially when either of these diseases is far advanced, imports badly for recovery. Not that perilous states are never recovered from—but the mischief of course grows rapidly with the march of the disorder; and the only available moment for treatment is at the very first intimation of danger.

In waxy degeneration, the appearance of small waxy casts in the urine is considered more favourable than that of the large ones; for in the latter case the tubes are denuded of their epithelial lining, and are therefore liable to a rapid destruction of their tissue. But the larger casts and effusion of blood are more favourable than their absence, when the renal circulation is evidently obstructed and ischuria threatens, or exists.

In chronic non-desquamative disease, there is very direct prognostic evidence from minute examination of the urine. If a large amount of albumen be present in scanty urine of low specific gravity, it indicates much renal difficulty in the way of impeded circulation; and we infer reaction upon the tissues. If ischuria be very threatening, the condition is an aggravated one. If there be slight hæmorrhage, it will probably relieve congestion, and so far be favourable; also it is reckoned a sign of an early stage of the disease; it being remembered that later, the Malpighian capillaries become so thick that no such exudation is likely to take place. There are exceptions to this, however, owing to unequal thickening

of the vascular tunics. Whilst albuminous urine persists, the probability of recovery diminishes, as a rule.

Oily casts, however, take precedence of the waxy, in gravity of indication. A little oil, observed during convalescence, would not, necessarily, be alarming, and is not unusual, for a short time; but an abundant and prolonged exhibition of it, accompanied by obstinate albuminuria, is of necessity a very serious—perhaps always a fatal condition.

The following decisions upon this state are expressed by Dr. Johnson. "These appearances indicate as serious and intractable a malady as tubercular disease of the lung." The succeeding sentence is *italicized* by him. "*I have observed this condition of urine in a large number of cases, and in not a single instance has the urine regained its natural appearances, or ceased to be albuminous.*" (*Op. cit.*, p. 404.)

Fatty degeneration may safely be pronounced incurable. It is, therefore, of the highest importance to secure a vantage-ground for the treatment of those states upon which it is known to supervene. When, therefore, any indications of these occur, especially of that described as "non-desquamative disease," that is the moment alike of imminent peril, and for any available treatment.

Johnson alludes to the absence of oil in the highly albuminous urine of mottled fat kidney, although there may be much of it in the kidneys; no tube-casts or any sedimentary deposit being observed. He considers this of little practical importance, because so infrequent.

Résumé: (Unfavourable.) Originally weak or deteriorated condition of the constitution *per se*, and the prior injuries received by it; all antecedent or concomitant maladies of importance, such particularly as affect the circulation or general system; cardiac, cerebral and pulmonary affections, obstinate diarrhoea, erysipelas of a gangrenous tendency, venereal cachexia, &c. (Grisolle, Rayer, *et alii*); and such as are especially expended upon the urino-genital organs; great abundance of albumen in the urine, or symptoms of suppression with uræmic poisoning.¹ An advanced stage of the disease before treatment is instituted (Rayer); personal ignorance or recklessness as to hygienic precautions; continuance of debauched habits and unavoidable privations are all elements of the most unfavour-

¹ Death from direct uræmic poisoning in the acute form is rare; but enough uræmia may exist to produce serous inflammations, which may be fatal. (Barlow, p. 489. *Op. cit.*)

able character. Relapse from an apparently improving condition is very grave.

(*Favourable*).—Early stage of the disease and prompt treatment; accidental, rather than systemic, or specific causes; previously healthy constitution, gradual return of the urine to its normal condition, with diminished albuminuria and continually decreasing dropsy (Rayer, Dalmas, and Grisolle); a return, or not a rapid loss, of colour, indicating tolerable preservation of red blood. Early cases of scarlatinal dropsy are, on the whole, favourable (Grisolle, Barlow). The occurrence of albuminous urine and anasarca towards the close of pregnancy is not so grave. Albuminuria is a common phenomenon at such times.

In granular contracted kidney, with great care and attention, life may be preserved for months or years. Dr. Christison thought that the chances of death were not at all proportioned to the amount of albumen in the urine; founding his opinion on the fact of its abundant loss in the early stage. To a certain extent, he considers its occurrence as of favourable import (at least he does not attribute death to it), but Rayer and others think this view erroneous.

Treatment.—The general preventive and remedial measures recommended for acute and chronic desquamative disease are those to be relied upon in the three forms of renal degeneration just considered. To obviate the causes is the first, and to prevent their recurrence, the next duty of the physician.

If possible to seize the right moment for prescribing change of air, and especially an ocean-voyage, it should be done; the measure has the sanction of high authority. In advising it, however (as in pulmonary disease), much caution and a discriminating examination are necessary—the decision largely affects the welfare of the patient and not a little the reputation of his adviser. A careful and comprehensive estimate of the chances should be made in each case.

Dr. Johnson discourages the ingestion of *fat articles of food* when fatty degeneration is threatened, or declared. He appositely refers to Magendie's experiments upon dogs—showing the effect of an exclusively fat diet. The result is well known; rapid death, and infiltration of all the organs and tissues with fat.¹

¹ No *exclusively* fat diet could, of course, be adopted by man, unless voluntarily, for experiment, which is unlikely; and if tried, would doubtless be soon abandoned; the remedial restriction seems wise.

Knowing the danger of dropsical effusion and renal disease after scarlatina, special care must be enjoined in guarding patients against exposure to cold, dampness, and other known exciting causes. The period when desquamation at the cuticular surface occurs is one of special danger.

In the acute stage of attacks, the French advise general bleeding, with more confidence than the English practitioners do. With the latter, we incline to *local* bleeding, unless there be extensive fever, or special constitutional indication. Leeches and cupping are advised by nearly all authorities. So are soothing compresses and cooling, emollient drinks. The treatment of any local lesions is no respect from that laid down in connection with acute and chronic desquamative disorder. Cerebral symptoms must be vigorously met by bleeding, blisters to the nucha, cold irrigation to the head (Dalmas), and calomel in purgative doses, but administered with caution, and only when indispensable. Salivation is greatly to be dreaded; it increases the patient's sufferings, and of course aggravates his malady.

The previous remarks relative to *diuretics* apply here. They should be used with care, the chief indication being removal of dropsical effusion which purgation has not influenced. When evident inflammation and hyperæmia are present they are generally inadmissible. Becquerel (*Séméiotique des Urines*) condemns them entirely, in this class of affections. Dr. Bright has less confidence in them than either Dr. Gregory or Dr. Christison; they recommended a combination of diuretic substances—such as squill with digitalis, or with cream of tartar. Others prefer them used in the form of decoction. Rayet speaks highly of a decoction of the horse-radish-root.² Dalmas enumerates several diuretics as having been successfully administered. Colchicum, carbonate and nitrate

¹ Dr. J. H. Bennett reports a case of Bright's disease, in which there was extensive dropsy, with marked albuminuria and all the unfavourable symptoms, where recovery took place chiefly under the use of bitartrate of potash. Some quinine was administered. Dr. B. advocates the employment of diuretics, and scents the idea of their doing harm in this affection. Advanced cases of Bright's disease were cured under their free use; the improvement invariably coinciding with the establishment of an increased flow of urine. (*Clinical Lectures on the Principles and Practice of Medicine*, second edition, New York, 1858.)

² His direction is $\frac{1}{2}$ an ounce in two pints of water, using the dried root; this amount may be gradually carried to 1 ounce or $1\frac{1}{2}$ ounce. If the *fresh* root be used, a less quantity should be taken, or nausea may be caused.

of potash, gin, tea and coffee, amongst others. Whenever a tonic or an excitant can be combined with a diuretic, the effect is greater and better. (Martin Solon.) Dalmas, whilst endorsing this opinion, considers the comparative innocuousness of *cantharides* in Bright's disease, and its good effects, in doses of from ten to forty drops, as confirmatory evidence. Rayet and certain English physicians also refer to this. Dr. Rees is not in favour of diuretics in any form of albuminuria.¹ Dr. Barlow, in common with most good practitioners, opposes direct diuretic action early in the disease, as a rule.

In a paper published in the *London Lancet* (July 4th, 1857), and entitled "Summary of Seventy-five Cases of Albuminous Urine," Dr. Thomas R. Heywood Thompson, of Liverpool, has presented some important and interesting facts. In an analytical table of all the cases, he has noted nine instances of granular, four of oily, twelve of waxy, and sixteen of epithelial, casts. In 57 specimens, blood, free or aggregated, was found.

He very properly opposes the careless administration of diuretics; and it is too true that these are often prescribed entirely empirically, and when they only stimulate kidneys already over-taxed. The urine is too often the last secretion of the body which is examined; and not uncommonly it is wholly overlooked. The superiority of the microscopic test over the chemical is rightly insisted on by Dr. Thompson.

All observers recognize the frequent failure of the most judicious treatment. This might be expected in view of the extreme gravity of the conditions; the infrequency of early remedial measures—either through neglect, ignorance, or hope of amelioration without them, on the part of patients—or rarely, it is to be hoped, from incompetence or hasty examination by physicians. Grisolle says, speaking particularly of the chronic stage, whether primitive or consecutive—"Le bon remède est encore à trouver; en attendant, nous dirons, avec un habile observateur, M. Martin Solon, que, dans cette maladie, un seul moyen ne suffit pas, mais qu'il faut savoir varier les remèdes suivant les indications spéciales qui se présentent." (*Pathologie Interne*, vol. ii. p. 767.) His experience is altogether that of failure to remedy the well established conditions of the organs, just described. The most discouraging expressions are used by Rayet, Becquerel, and many others, relatively to the

¹ Analysis of the Blood and Urine; Treatment, &c. &c.

settled disorder. Dr. Barlow remarks that the treatment of Bright's disease "has been reckoned among the opprobria medicinae;" this, however, as he correctly observes, arises from our being almost constantly obliged, in these affections, to deal with the consequences of destroyed function resulting from a structural change already effected by diseased action, rather than with that action itself.

The great disadvantage evidently lies in the fact that the enemy has stolen upon us, and we cannot repel, perhaps not even hold him at bay. By universal consent, but little except palliation remains for the later or even middle stages of the class of affections we are now considering. Dr. Barlow very judiciously remarks that the existence of marked pallor should preclude the abstraction of blood. A modified and better depletion is effected by antimony, which "at once lowers the action of the heart and large arteries, relieves congestion in the extreme circulation, and promotes the cutaneous secretion." (*Op. cit.*, p. 494.) For this purpose his formula is, when the stomach is irritable, tartrate of antimony and potassa, one-fourth of a grain, extract of hyoscyamus four grains: in a pill: to be taken every four and six hours; otherwise, he advises it in solution, beginning with $\frac{1}{4}$ or $\frac{1}{2}$ of a grain. The acetate of ammonia is the best vehicle for this medicine, early in the disease.

In the large white, or mottled fat kidney, diuretics, as we have seen, are most admissible, when called for by excessive *serous* effusion. Elaterium and infusum scoparii compositum are in repute with most practitioners: antimony continues to be of service in many cases of this description. Hydragogue cathartics are useful when dyspnoea with sibilant respiration indicates serous effusion into the lungs or around the glottis. Locally, in such a case, very hot fomentations to the throat and a blister to the nucha are advised; tracheotomy, even, may be demanded.

In the *Gazette des Hôpitaux* of the 20th of August, 1857, the evacuant method of treatment in Bright's disease is highly lauded. A report of a case from the wards of M. Legroux, at L'Hôtel Dieu, is given, and the result is certainly very satisfactory. The reporter, M. Warmont, speaks of the method as having been of late years often successful. In the instance he relates, the patient was a man of strong constitution, of previous unbroken health, and of good habits. We can conceive of success by the plan advised with such a man, but in the majority of cases should fear the exhausting effect, and which even this patient experienced in a marked degree.

The cause of the albuminuria seemed to be, working in a cellar from morning till 11 o'clock in the evening, during six months. Antimony and diuretics, producing emesis, catharsis, and diuresis, were the means used. A certain amount of influence is attributed to the diuretic action of the "*tisane de reine des prés*" (*Spiræa ulmaria*), a favourite remedy with M. Legroux.

Treatment, so generally futile, unless begun at the dawning of the disorder, even under the advantages which wealth and comfort give, must be utterly ineffectual amongst the poor, unless charity put them in a more favourable position. A degree of this may be sometimes attained in hospitals and similar institutions, but the chances are immensely against such patients. It can hardly be too strongly insisted on, that early treatment is that alone which can present any reliable ground for hope of success, and whilst this is true for the renal affection, it is equally so for any concomitant complaints, especially inflammatory ones, if the renal disease be advanced when they occur. Rayer well remarks, that "the difficulty and complexity of the treatment of chronic albuminous nephritis, is in direct proportion to its comparative simplicity in the acute form." The same relation, he continues, obtains with regard to the efficacy of remedial measures. Whilst in the acute form they are efficacious, they are generally powerless in the chronic. "In the majority of cases, the only end to be proposed and the sole success to be hoped for, is the temporary arrest of the disease, or the slackening of its progress."

C. BRIGHT'S DISEASE IN CONNECTION WITH PREGNANCY.—ECLAMPSIA PUERPERALIS.—In a work recently published by Dr. Braun, of Vienna,¹ there is a chapter devoted to the "Uræmic Convulsions of Pregnancy, Parturition, and Childbed," and which has been translated by J. Matthews Duncan, F.R.C.P.E., etc., of Edinburgh, and published first in the *Edinburgh Medical Journal*, for 1856-57, and subsequently in a separate volume of about seventy pages. (London: Simpkin, Marshall and Co.)

The author advances the doctrine that *Eclampsia Puerperalis* is

¹ *Lehrbuch der Geburtshülfe mit Einschluss der operativen Therapeutik, der übrigen Fortpflanzungs-functionen der Frauen und der Puerperal-processes.* Von Dr. Carl R. Braun, K. K. O. Ö., Professor der theoretischen Geburtshülfe und Geburtshilflichen Klinik für Ärzte an der K. K. Universität in Wien, etc. Mit. 150 Holzschnitten. Wien, 1857.

acute neurosis of motility," and, what more especially relates to the subject we are now considering, that it "occurs only as an accessory phenomenon of another disease, generally of Bright's disease in an acute form."

He also believes with Frerichs, and certain others, that carbonate of ammonia, formed during the decomposition of urea in the blood, is a mischievous material; but is not so exclusive as Frerichs, for, like him, he allows much morbid influence to "the retention (in the blood) of excrementitious extractive matter of the urine." In a paragraph he remarks: "In several diseases, as caries of the jaw, angina tonsillaris, typhus, pyæmia, ischuria, and blennorrhœa of the urinary bladder, we sometimes find, in the blood, carbonate of ammonia, just as in uræmia and Bright's disease. Hence carbonate of ammonia in the blood cannot be regarded as a characteristic indication of uræmia, and in many constitutions, uræmia may be produced by extractive matters in the blood."

Litzmann believes it demonstrated, however, that in the majority of the cases of uræmia, the blood does contain ammonia, formed during the decomposition of urea in the blood; and that the urea was either formed in the blood, or secreted in the urinary passages and absorbed into the circulation. Christison referred to the strong ammoniacal odour exhaled by certain specimens of urine, in granular degeneration of the kidneys.

Dr. Braun defends "the theory of the identity of uræmic intoxication in acute Bright's disease and puerperal eclampsia," and mentions the names of Frerichs, Litzmann, Wieger, Oppolzer, and many others, as coinciding with him; he also gives a lengthy list of those observers who oppose the view. Amongst the latter, Mazzoni is conspicuous.

The cause of Bright's disease in pregnancy is believed by Dr. Braun, Frerichs, Litzmann, Wieger, and others, to be chiefly a mechanical one; and to consist in "the retardation of the stream of venous blood in the kidneys, from the compression of the venous trunks by the gravid uterus." This sort of Bright's disease is considered less unfavourable than other forms of it; but premature labour is very apt to follow. It is rarely cured during pregnancy, because the cause remains.

In another portion of the chapter referred to, Dr. Braun says, in speaking of the hyperæmia of one or both kidneys, which is the primary stage of acute Bright's disease, and caused by conges-

tion of venous blood, "the nutrition of the tubuli uriniferi suffers," after inflammation has been set up, and they enter a stage of fatty degeneration. "The essence of the Bright's disease, lying at the root of the eclampsia, is then, according to this view, an inflammatory process (*nephritis diffusa* of Reinhardt), an explanation which Frerichs considers to hold good only so far as the exudation of blood-plasma is connected with a paralytic-like dilatation of the capillaries; whilst, in cases where mere pressure of the pregnant uterus upon the renal veins is the cause of the exudation, he will not admit the existence of inflammation proper." (*Op. cit.*, p. 14.)

Dr. Duncan seems to think that too much stress is laid by Dr. Braun upon mere pressure by the pregnant uterus; he admits, however, that, when really exerted upon the renal veins, the influence of pressure is undoubted.

D. BRIGHT'S DISEASE IN CHILDREN.—It would seem that the class of affections known under the above title could not be so common in children as in adults: if we except the cases following scarlatina. Most of the external causes must of necessity less frequently affect children than adults; one great predisposing cause, intemperance, cannot be efficient.¹ Privation, neglect, and damp lodgings may aggravate the malady when it occurs in the child from other causes, and often produce it. This is especially true in large cities and among the very poor. The secondary form follows the eruptive fevers, especially scarlatina: it also succeeds intermittents. Gregory thought it never present in children. Beequerel, in 1841, announced his opinion that it was almost as common in children as in adults, and any differences observed were attributable to the age and antecedent affections of the subjects. (*Op. cit.*) Whilst the lesions observed by him were nearly the same in children and adults, a few differences were observed. He found the granulated structure of the renal cortex, in the second and third stage of disease, more marked in children. The elementary lesion is the same, but the external characteristics vary. 1. Slight increase of volume of the kidneys; partial adherence of their investing capsules;² the cortical substance somewhat irregular (*bosselée*).

¹ M. Bouchut (*Diseases of Children*) remarks the rarity of the affection in children.

² This is sometimes wanting.

nooth, and of a bluish-white colour; some stellated injection
 1. A conglomeration of large granulations, packed together,
 observed, sometimes forming small, white granular plates:
 trophy of the cortical substance throughout, even between the
 the latter often cut into,¹ and partially destroyed. 2. With
 enlargement of the kidneys, there is a yellowish colour (like
 'chamois leather) without any mingling of sanguineous injec-
 Small granulations, of a somewhat lighter colour, are thickly
 over the capsule.

similarity of the lesions in the kidneys of very young sub-
 those noticed in adults, is to be remarked: likewise the con-
 ent maladies, and their results, are much the same. Rilliet
 arthez do not agree with the latter observer as to the fre-
 y and distinctness of the granulations. They note only one
 e in their Treatise upon the Diseases of Children, published
 8. In this, the granulations were found both on the surface
 the substance of the renal cortex; they were round, and of
 e of a pin's head; their characteristics were such as are usually
 ed. The child had great general anasarca, and was cachectic
 berculous. The urine was not tested *during life*, but presented²
 gulation, as from albumen, by heat or acid.

se authors consider albuminous nephritis (Rayer's term for
 's disease) to be characterized by hypertrophy, morbid colour-
 and softening of the cortical substance of the kidney. (*Op. cit.*,
 p. 591 *et seq.*) Advanced to a *second* degree, the same tissue
 more or less extended yellowish spots, which a still further
 as (a *third* stage) discovers pervading the entire cortex and
 mes even the tubular portion of the organs. They decide
 e disease does not reach the *fourth* degree in children so often
 he adult. In 23 children out of 49, the urine was very albu-
 s; of these, 12 recovered, 11 died. Sixteen others presented
 lesions *post-mortem*, referrible to an inflammatory stage of
 's disease; but no anasarca was declared, and the urine was
 amined during life. Another child showed, necroscopically,
 ces of the malady, with some *débris* of urinary calculus.

ally, *dropsy* and *albuminous urine*, the chief signs vitally ex-
 d, are quite as distinct in children as in adults. Renal pains
 but twice remarked by Rilliet and Barthez, in the albuminous

chancrés."

² That is, we presume, the urine found in the bladder.

nephritis of children; both patients recovered. Lumbar pain, indeed, they found very rare in all nephritic cases. The possibility of its existence not being always recognized in very young infants is referred to by them, but in those older, it could hardly have escaped their notice. There would, we think, be sufficient intimation of *severe* pain, even in infants—although to localize it accurately might be difficult. It is doubtless infrequent.

Blood has been noticed in the urine of children affected with albuminuria; the urine varies in amount, in these cases. When scanty, its colour is deeper than when abundant; light hue and clearness, or only slight cloudiness, being then its characteristics. This bleeding is decided not to be a simple hæmaturia, but an effect of degenerative disorder.¹

Less febrile action is observed in albuminous, than in acute, nephritis of simple form. The acute and chronic stages are distinctly marked in children; but the latter are considered far less common in them than in grown persons—not constituting one-half of the cases. The chronic may follow the acute disease, or arise independently. Similar complications accompany it as in the adult; its duration varies, but neither recovery nor death occurs (with rare exceptions) before the fortieth day.

Rilliet and Barthez comprise the disease under the titles primitive, simple, or complicated; secondary, simple or complicated. These forms may be acute, subacute, chronic, pyretic or apyretic.

They were very fortunate with their cases; more recovered than in simple nephritis, and the affection seemed more amenable to treatment. The previous condition of the patients largely influenced the results, and secondary were more fatal than primitive attacks.

The cases following scarlatina, although always serious, often recover. Tuberculosis is accompanied by albuminous nephritis, but with comparative infrequency. Observers, however, differ considerably in respect to the relation between the two affections.

Rayer, and Rilliet and Barthez have found Bright's disease conjoined with typhoid fever, and Becquerel once noticed it during convalescence from that disease.

It seems more frequent in boys than girls; out of 23 cases, 19 were boys. Under 5 years of age, it is pronounced rare. Very

¹ Rayer, Bouchut, *et al.*

young infants have exhibited the signs of the disease. Rayer saw bloody and albuminous urine in a child nine months old, and Dr. Simpson, of Edinburgh, has recorded instances of albuminuria and Bright's disease in young children born of eclamptic mothers. Dr. Duncan, the translator of the portion of Dr. Braun's work previously referred to, says, in a foot-note to page 21, "some remarkable cases of children born of mothers suffering from albuminuria, have attracted my notice. In one, the child, above a year old, suffered at the same time from laryngismus and albuminuria."

In connection with the phenomena of uræmic intoxication and eclampsia, attributed mainly to carbonate of ammonia retained in the blood, Dr. Braun (*op. cit.*) states that, "if, after numerous convulsive fits, the child is born still alive, a large quantity of urea is found in the blood taken from the umbilical cord; but if it is born dead, we can, immediately after the birth, demonstrate the presence of carbonate of ammonia in the foetal blood."

The experience of Dr. West (*Diseases of Infancy and Childhood*) is similar to that of the latter writers in reference to albuminous nephritis; at least in two cases, where he found it to follow the removal of a boy "from a dry and airy, to a damp and close, dwelling;" he likewise observed it during convalescence from typhoid fever. The latter case was very severe, and was accompanied by convulsions; death supervened from acute pleurisy.

The agency of some change in the blood seems now nearly universally allowed in the production of this class of cases. Not only the poison of scarlatina, but other powerful disturbing influences are recognized. The fact of albuminous urine being observed in typhus and typhoid fever, and sometimes in measles, unconnected with renal disorder, tends to ratify this opinion. (West.) Copland, also, long since called attention to the fact that children often have albuminous urine after, or during acute disease, and that this is not rare after the eruptive fevers. (*Dictionary Pract. Med.*, Dropsy.)

Any impoverishment of the blood, especially if the state be long continued, is very likely to act upon the kidneys and their associate organs. The tuberculous diathesis may certainly be very efficient as a cause. Lately, a medical friend of excellent judgment was inclined to infer a strong analogy between tuberculosis and Bright's disease, resting partly upon an explanation of the *rationale* of the

former, given in the *British and Foreign Med.-Chir. Review*, for April, 1855.¹

Certainly the existence of tubercle would be an unfavourable element of *prognosis*, alike from its inherent lethality and the aggravation it would cause in the renal malady by contributing to the general cachexia. Dr. West found that death from Bright's disease in children was frequently due to hydrothorax, pleurisy and pneumonia, or to convulsions, much as in adult cases. The first is, in his opinion, the chief cause—and, generally, much anasarca also complicates the affection from the beginning. Convulsions, especially with a fatal result, as in granular renal degeneration in grown persons, he found quite rare.

Most of the bad symptoms in adult, attach also to infantile cases. Sudden and great diminution of the urine is of the worst import. Abundant hæmaturia should lead us to expect slow recovery, although not invariably. The urine contains most of the matters which belong to that of adults; crystals of lithate of ammonia are mentioned by Dr. West, in addition to mucus-corpuses, epithelium-scales and urinary tube-casts; and he also remarks the occasional long continuance of albumen in the urine, even after it has resumed a healthy appearance. "I have found traces of its presence more than two years and a half² after an attack of scarlatinal dropsy." (*Op. cit.*, p. 527.)

Much the same appearances are observed *post-mortem* in the kidneys of children as in adults. In the slighter forms they are dark-coloured, congested, heavy, full of venous blood. The contrast on section, between the pale, yellowish cortical, and deep-red tubular portions is very striking. Much vascularity is usual over the surface of the calices and infundibula; whilst often the genuine granular change of the organs is observed—the granular atrophied kidney already described. A degree of friability pervades the kidney, perhaps even more noticeable than in adults. Sometimes these renal changes occur in a very short time. One instance is related

¹ Much analogy between the established phthisical tendency and that leading to Bright's disease, is set forth in this interesting and scientific paper—which will well repay perusal. It is entitled "On the Development of Tubercle in Chronic Phthisis, and its Connection with Fatty Degeneration of the Epithelium of the Air Vessels, etc. etc. By C. Radcliffe Hall, M. D., F. R. C. P. E., etc."

² After so long a period, might not some other, *occasional*, cause have produced it?

of their extreme degree in a boy $5\frac{1}{2}$ years old, "who died of a serous effusion into the chest on the 22d day from the appearance of the rash of scarlet fever, and the 13th from the commencement of the dropsy." (West.) This case was more rapid than any others known by this observer.

Nearly the same pathological explanations as heretofore given are now accepted by the best observers of infantile diseases. The circulatory obstruction is distinctly recognized; congestion, dilatation and a varicose state of the capillaries, with their final destruction in many cases. Next, we have the over-action demanded of the kidney; secretory stimulation, great increase in epithelial cell-production, with all the resulting mischief previously detailed. In children of ordinary vigour, however, it is evident that more may be expected in the way of restoration than in systems worn out either by excess or age. Thus the reparative power characteristic of early life tends to the ultimate removal of the mischief, and warrants a more hopeful prognosis as to the complete recovery of a child from the effects of scarlatinal dropsy, than would be justifiable in a case of albuminuria in the adult.

Treatment.—The general directions for remedial management are the same as in adults. Special care should be taken to prevent imprudent exposure after scarlatina. The period of desquamation being the one most fraught with danger, this should be impressed upon those in charge.

The active stage of the disease, in robust children, at all events, should be met by depletion; local, if that will answer, but general, if good judgment deem it indispensable. Both are not infrequently demanded; but a distinction should be made as respects age and firmness of constitution. Rilliet and Barthez advise leeches alone to children under 7 years. West speaks of taking from 4 to 6 ounces from the arm of a child 5 or 6 years old, if the attack be severe and attended by high-coloured, scanty, very albuminous urine.

He adds that a repetition of the general bleeding will almost never be necessary. Rilliet and Barthez also caution us to the same effect, and advise no renewal of bleeding unless specially demanded or strength permit. Local depletion may subsequently be important. Every attention should be paid to the state of the constitution—there may be a temptation to bleed those who can ill bear it; and whilst it is true that general depletion is sometimes the only resort at this epoch, we can remember many instances in these

and other cases, where we know the lancet ought never to have been employed.

The excitement of cutaneous action is an all-important step; and one much insisted upon by judicious practitioners. Dr. West is very decided upon this point. "In proportion to its success, do we see danger averted and convalescence hastened." He recommends the hot-air bath, as being not only more stimulating to the skin than that of warm water, but exposing the patient less to the risk of catching cold. Rilliet and Barthez remind us to give the warm bath (water and vapour both used) some hours *after* bleeding. Its use twice in the twenty-four hours "seldom fails, even when its action is most transitory," to induce at least a temporary "copious perspiration." Antimony in nauseating doses, every four hours, occasionally combined with Dover's powder, is useful in conjunction with the bath. When the anasarca diminishes, and the albuminous condition of the urine begins to be removed, mild diuresis may be safely and usefully employed; and the external application of squill and digitalis has found favour with some practitioners. When we reduce the antimony, acetate of potash, and extract of taraxacum are recommended. Recrudescence of the previous symptoms should induce repetition of the first treatment. Soothing cataplasms to the lumbar region, and bland, mucilaginous drinks are useful.

There is an almost general concurrence in preferring aperients to cathartics. Many children can ill bear violent purgatives, in this affliction, and the occurrence of rebellious diarrhoea is to be feared. Becquerel remarks the liability of young children to sink under powerful purgation, and warns against the unguarded use of cathartics. Calomel, and Seidlitz water, after two weeks of more active treatment, are recommended.¹ Hæmorrhage from the kidneys, if excessive, must be met at once; else the child may soon become enfeebled, and destructive disease go on even more rapidly. Slight bleeding is of little comparative consequence; and, in the early stages, may even be alleviatory. Gallic acid is considered the best remedy for excessive hæmaturia. West gives five grains every four hours to a child five years old. The action of the skin should be maintained in these cases by the antimonial course, carefully watched. If, in the *chronic* form of albuminuria, the drain be excessive, gallic acid may be advantageously used.

¹ Rilliet and Barthez.

The diet must, of course, be modified according to the stage and activity of the disease. Light at first, it may be necessary gradually to increase its solidity. French writers recommend milk after three or four days; and more substantial food is unsafe, until we observe the albumen notably diminished.

Convalescence is a most important period, and every precaution will be necessary to prevent the occurrence of relapse. Warm clothing—especially the use of flannel next the skin—frictions of the limbs, and strict avoidance of cold and dampness, are imperatively necessary. Tonics are demanded in most cases, and the indications for their employment are generally very plain. The anæmic, feeble, flaccid condition of many convalescents, calls for bark and iron, with wine and generous food, moderately given at first, and increased as the system bears them. The tincture of the muriate of iron—nearly always an efficient preparation—is found very serviceable in these cases.

Much depends upon early detection of renal threatenings. When the disease is insidious, and takes us, at last, by surprise, by a sudden and serious outbreak, there is generally but little chance for recovery.

V. SUPPURATIVE NEPHRITIS.

A. FROM DISEASED STATE OF THE BLOOD.

Although in certain cases the conjunction has been observed, it is the exception whenever pus, either moulded into the form of the uriniferous tubuli, or homogeneous, is found in those forms of nephritis and degeneration hitherto considered.

The presence of pus in the urine, when its origin can be distinctly referred to the kidney, always excites our alarm. The metamorphosis of the epithelial tube-cells into pus-cells, or, "to speak more guardedly, the replacement of one form of cell by the other" (Johnson), is significant of formidable difficulty.

There are certain phenomena manifested in connection with this affection, sufficiently explanatory of its pathology. Occasionally, the history and obvious condition of the patient almost warrant us in using the term *purulent diathesis*. There seems a tendency to the formation of *dépôts* of pus; and it is fortunate when these are made externally. In no cases does it seem more evident that a blood-

poison is being eliminated, than in these. The successive crops of boils, and the repetition of carbuncle, sometimes observed, are apposite illustrations. Many instances are recorded, where retrocession of these has determined disease of the viscera, followed, very generally, by death. Whenever the kidneys are put to the task of pus-elimination, the struggle is likely to be a hard, and usually a destructive one.

A stout man, with boils and carbuncles, showing a depraved condition of the blood, came under Dr. Johnson's care, in hospital. The outward purulent demonstration was excessive, reiterated, and annoying. He had rigors and diarrhoea; the urine was at first pale, acid, limpid, and loaded with albumen; its specific gravity was 1.010, and seventy ounces were passed in twenty-four hours; no pus on his first entry. His habits had been intemperate, and much night-work was demanded of him. Slight rheumatic pains had troubled him. Frequent micturition and dropsical tendencies were declared, four months previous to his admission. This man, improving under hospital care, was allowed to go out of the Institution, for air and exercise, when he drank largely of wine and spirits, and serious renal symptoms immediately came on. The first warning was a marked change in the urine; tube-casts, with *pus-corymbules* were observed; the albumen, which had diminished, became again abundant, while the specific gravity was 1.011, and afterwards 1.014. No physical discomfort followed, the man being, by his own account, free from pain, and thinking himself better, even within an hour of his death. Confusion of intellect was soon noticed, with increase of the purulent deposit in the urine; next, a comatose state supervened; there was oedema of the side on which he lay, with crepitation and friction-sound on auscultation; death occurred eight days after the first pus was remarked in the urine.

The kidneys were twice the normal size, of a yellowish-white colour, their substance, generally, firm. Extensive suppurative inflammation of the left kidney existed, there being two abscesses of the size of English walnuts, pointing nearly at the surface of the organ. The cortical substance showed suppurative points scattered through it. "Two of the medullary cones were destroyed by supuration." There was redness of the lining of the renal vein, and lymph and pus within it. Small deposits of pus were found in the right kidney. From the intense redness and vascularity about these renal abscesses, their very recent origin and rapid progress was in-

ferred. The traces of chronic desquamative nephritis were likewise observed—recently-formed epithelium in some tubes, disintegrated in others, and a few oil-globules. There was also some purulent deposit in the liver, and a desquamative cell-action, analogous to that in the kidney. Whilst from this case we may conclude that chronic desquamative nephritis was the principal affection, it is almost certain that no suppurative action would have occurred, had it not been for the patient's self-indulgence. In such cases, there being an effort to eliminate the noxious material from the blood, its original, and comparatively safe, external manifestation is thus diverted to internal organs. In the above instance, its weight fell upon the kidneys, and undoubtedly through the direct agency of the stimulant and diuretic action of the spirituous liquors used.

Nature of the Affection.—Awakened by this blood-poisoning, the morbid process consists in a strong eliminatory effort, recoiling upon the secretory tubes, depriving them of their normal cells, and, still worse, destroying their basement-membrane, gradually infiltrating the surrounding renal tissues with pus; thus secondarily returning it upon the vital torrent, so that "the evil grows by what it feeds upon."

Of course, it is impossible to give a reason why pus should be formed in these cases, more than in many others, where simple desquamative disease alone is set up, from a similar cause. Possibly, what is often vaguely termed *idiosyncrasy*, may be pleaded here. There are constitutions peculiarly prone to certain forms of disturbance and lesion; perhaps the pyogenic tendency has influence in this way. Again, a very enfeebled constitution, or one much tried by intemperate and debauched habits, we reasonably conclude to be open to such disturbance and alterations, especially during illness, or on peculiar provocation. In such subjects, all the usual causes excitatory of renal disorder are particularly potent; and when there is an impoverished blood, carbuncular and furuncular exhibitions, it is well known, are common. Such a state is fraught with danger.

In another case, where pyohæmia existed, whilst the exciting cause of the phenomena seemed to be wet and cold, the blood undoubtedly was in such a condition as to invite the disease; the great secretory organs felt the weight of its attack, and showed the chief lesions.¹

¹ Johnson (*op. cit.*, p. 430).

The *secreting cells* seem to be the mark for the assault, be the gland what it may. The affections of the liver offer a striking analogy with those of the kidney, in this respect. The blood, unfit for circulation, is met by the secreting cells with an effort at elimination of its foreign material; whence arises the mischief already described. When abscess is formed, it is so, of course, at the expense of the organic tissue in which it is seated, a general disorganization ensuing.

Whilst chronic desquamative disease bears a close relation to suppurative nephritis, it is oftenest wholly distinct, and should not be looked upon as directly a cause, or necessarily a first, or preparatory stage. Purulent casts, in the desquamative forms of renal disease, or in the true degenerative action, are exceedingly rare. The importance of an accurate diagnosis in these cases must be apparent. The microscope has lent powerful aid in elucidating the different conditions characterized by pus in the urine.

Vesical affections producing purulent urine, or a discharge of pus with a serous liquid, resembling albumen, would now doubtless be referred at once to the proper source. The phosphatic diathesis, by retaining alkaline urine in the bladder, may cause vesical disease with pus, the kidneys being healthy. It should, however, be remembered that renal and vesical disorder may often be conjoined, and the intensity of the one should not lead us to lose sight of the other. Johnson mentions non-desquamative disease, with vesical irritation, as causative of purulent urine.

Rayer, Becquerel, Dalmas, and others, have pointed out many affections in which purulent urine has been remarked, and purulent deposits have been found in the kidneys, occasionally with false membranes lining the pelves, the origin of which must undoubtedly be referred to the blood, and its poisoning by the disease. They instance gangrenous affections, certain rheumatic and gouty cases, farcy¹ or glanders, carbuncle, variola, and yellow fever. Rayer has a section upon the production of nephritis by purulent resorption. A remarkable instance is given by him, of the sequence of this on typhoid fever. In one such case, pus could be pressed out from the cones. There were also slender streaks of pus in the cortical portions of the kidneys. He quotes from a report by M. Lélut (*Observations de Phlébite chez un aliéné Paralytique. (Journ.*

¹ The term used by the French is "*morve aiguë*," literally translated above.

des Progrès, 2e série, t. i. p. 213, 1830), where seven or eight purulent deposits were found in the kidneys of a demented person, dying of phlebitis. Becquerel records five cases of purulent infiltration; the cortical portion, in isolated localities, being the site. There were white, granular, friable plates—with sometimes a little fluid pus in their centre. In these instances, there was no communication with the calices or pelves of the organs.¹ Rayer gives an account of a very interesting case of *rheumatic nephritis*, as he terms it, where there was extra-renal abscess, which was opened by M. Velpeau, with a bistoury. The patient, though long in a critical state, recovered. He also refers to the announcement, by a veterinary surgeon, of sero-purulent effusions into several tendinous sheaths, in a mule affected with rheumatism, accompanied by double nephritis. Analogically, we may infer the possibility of the purulent action being diverted to the *kidneys*, with an almost certainly fatal result. The fact of the deposition of lymph in the kidneys, in cases where rheumatism is combined with nephritis, is mentioned by Rayer, who also thinks that large purulent collections in the kidneys are less dependent upon simple inflammation of the organs, than upon such as is originally developed in their calices and pelves.

Renal purulent deposit is sometimes a sequence of vesical disease. Here, aside from the possible communication by continuity of passages, infection of the blood must be allowed the chief influence. Jones and Sieveking mention a case of this nature, where they found the renal structure "on the point of fusing down into fluid pus." (*Op. cit.*, p. 546.) When abscess is fairly formed in the kidney, its indefinite extension is nearly certain, and the case, of course, hopeless. The "fusible product"² around these purulent collections is easily convertible into pus, and the margin of the disease, in consequence, rapidly and constantly changes.

In this connection, it may be well to state the usual *modes of evacuation* of renal abscess:—1. Into the lumbar region, through the external abdominal walls. 2. Internally, into the peritoneal cavity. 3. Internally, into the colon, upwards, or into its descending por-

¹ In these cases, the concurrent affections were glanders (*v. note, p. 248*), purulent fever, heart disease—joined with cirrhosis of the liver—chronic gastritis, and typhoid fever. In all, blood-disease is more or less existent.

² Rokitsansky.

tion. 4. Into and through the bronchi, by perforating the diaphragm.

Prognosis.—Purulent casts in the urine, indicative as they are of serious morbid action in the secreting cells, and of their being replaced by pus-corpuscles, must always awaken apprehension. The degree of danger may be quite accurately measured by the character of the purulent casts, or corpuscles, observed. If large, and not joined with the usual *liquor puris*, Johnson considers the prognosis more favourable than under the converse conditions. In the latter, where numerous casts and pus-corpuscles, with much free pus are seen, demolition of the basement-membrane of the tubuli, with consequent extension of the destructive process to the general tissue of the organ—*renal abscess*—follows. The former condition is a slighter deviation from the normal epithelial cell-formation, and though very unfavourable, admits the hope of recovery. The latter may be looked upon as an irretrievable loss of substance, and a desperate state. Dalmas remarks that recovery from chronic nephritis, after suppuration, is extremely rare; instances are, however, on record. Chomel has reported such. Purulent effusion into the peritoneum, from perforation of the renal tumour, is constantly fatal. When renal abscess bursts into cellular tissue, there is less danger; but the lesion of the kidney is very grave. Notwithstanding, recoveries from this condition are cited.¹

Treatment.—The general course pursued in *acute desquamative nephritis* is that best suited to the present form of renal disease. At the first indications of disorder, every care should be taken to ward off the continuance of acting causes; to combat local inflammation cautiously, but decidedly; to renew, as far as possible, the strength and enrich the impoverished blood. This can only be effected gradually, and at the fitting moment; we cannot give stimulants or tonics, until inflammation subsides, and a favourable change appears. But, if we are able to check the advance of the inflammatory action, and see the urine approaching again to its normal

¹ "I have seen recovery take place in two or three cases, in which cells not to be distinguished from pus-corpuscles, were present in the casts in considerable number, and also free in the urine. A very marked case of this kind was that of a boy suffering from dropsy after scarlatina, whose urine was loaded with pus-casts and pus, at least with cells exhibiting the two or three central bodies upon the addition of acetic acid, and presenting all the characters of pus-corpuscles." (Dr. L. S. Beale, *Urinary Deposits, etc.*, text to Plate XVI. pp. 37-8.)

standard, we may amend the general condition, and not infrequently meet the symptoms of exhaustion by the appropriate measures. The task is a difficult one, and failure is lamentably more frequent than success. Renal abscess, pointing externally, should be opened as speedily as possible, that the pus may be diverted outwardly. The same course, with any modifications suggested by circumstances, will be indicated, if it be believed that the kidney is the original seat of the purulent collection. A case illustrative of this treatment is related by Watson. Great relief was afforded by the opening of a tumour in the right renal region. The evacuation of pus was large, and it was mixed with shreds of cellular membrane. After a while "the discharge ceased, the swelling subsided, and the opening healed." It was hoped that the abscess was only extra-renal, but the swelling and symptoms recurred, and the patient sank about one month after the first operation. It was found that the right kidney was the original seat of the purulent collection. The left was "quite healthy, and of sound structure," but was much enlarged. It was concluded that death was owing to the wasting, purulent drain, irritation and pain, and not to a want of secretion of urine. Would the maintenance of an external opening have given the patient a better chance? The drain, it is true, would have continued—perhaps indefinitely—but no new operation would have been needed, and possibly much of the irritation and pain derived from the second accumulation—the tension, heat, &c.—would have been avoided. The case, however, seems a desperate one. Keeping patients in bed, and using every caution against exposure, are points it is needless to insist upon.

B. FROM EXTERNAL VIOLENCE.

The rarity of this affection affords but little opportunity of observation. The *rationale* of the pathological action may, however, be easily inferred. If a blow be inflicted, or a severe fall sustained, the weight of which comes upon the renal region, there may be actual lesion of the kidney at the time.

The shock may occasion renal bleeding; and this perhaps without fracture of the tissues. Inflammation is likely to be set up over a considerable extent, and rapidly; abscess and its consequences may therefore be apprehended.

Prognosis.—Great danger attaches to cases of this description. Persons of vigorous constitution and unimpaired health the most

frequently escape. Much depends upon immediate and judicious treatment. Should suppurative action progress far, the strength of even a good constitution will fail. In some, the effects of its *incipient* stages cannot be borne. Patients are not out of danger because temporary amendment takes place. Continued vigilance is demanded for a long period; and hygienic precautions often cannot be safely relaxed for months and years.

Treatment.—After severe injury by external violence applied to the renal¹ region, the physician's first duty is to endeavour to prevent inflammation, so very prone to run into suppuration. Confinement to bed, at once, with low diet and the blandest drinks; proper attention to ensure a free state of the bowels, by mild laxatives, and local applications of a soothing nature, are demanded. If the lesion be severe, accompanied by heat and pain, more or less deeply-seated, leeches or cupping will be required. When the patient is permitted to rise from bed, he must be faithfully warned of the great risk he will incur by the slightest exposure to inclement weather, extreme fatigue, and, more than all, by the abuse of stimulants, or of rich and heating food. These precautions are very essential, and often so for a long time. The clothing should thoroughly protect against cold and dampness, without being so heavy as to induce perspiration and lassitude on ordinary exertion.

When uneasy sensations linger about the loins, or the seat of the injury, continued counter-irritation is advisable; sinapisms or ammoniated liniment may be employed. Dr. Johnson, in addition to these means, strongly recommends the establishment of an issue or a seton in the region of the loins.

If it be impossible to subdue inflammation before the suppurative period, our next care is for the *exhaustion* which must sooner or later follow, and against which we endeavour to fortify the system. The diet must be made more nourishing, though still necessarily bland. Aromatic sulphuric acid, with or without quinine, and often ferruginous preparations, will be needed. If, by these means, the strength can be maintained, we may often hope for recovery.

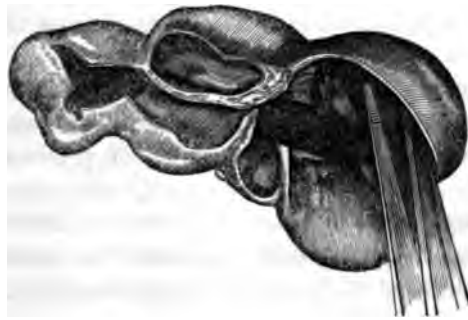
¹ See Appendix, Note S.

VI. NEPHRITIS FROM RETENTION OF URINE; PYELITIS; NEPHRITIS
FROM RENAL CALCULI.

Stricture of the urethra is the most frequent cause of renal inflammation from retention of urine. If long unrelieved, the consequences are most serious. The morbid action extends backwards from the strictured portion of the urethra, and inflammation, proportioned to the extent of the obstruction, and to the time of its continuance, is excited. Pus is often formed. Consequent on this retrograde inflammation, is thickening, and sometimes sacculation of the bladder; dilatation of the ureters, pelves, infundibula and calices of the kidneys. This condition is very frequently followed by inflammation of the lining mucous membrane of the renal cavities, with the production of pus. This is the Pyelitis¹ of Rayer.

Morbid Anatomy.—In acute cases, there is vivid red injection with thickening, friability and softening of the mucous membrane, and sometimes a "villous aspect." (Jones and Sieveking.) There may be actual ulceration,² or a covering of false membrane. Expansion

Fig. 24.



Kidney converted into cysts.

of the cortical substance is remarked, and upon the capsular surface, certain irregularities or "bulgings" are likewise observed, corresponding with the original lobes of the embryo kidney. It sometimes happens that the changes resulting from distension by

¹ *Néphaléc, pelvis.*

² The medullary cones are often found flattened by the pressure of the urine, with occasional ulceration of their apices. (Rokitansky; Johnson.)

the incarcerated fluid are all that are discovered, but inflammatory products occur, at other times, throughout the entire renal tissue. Lymph and pus obscure, and sometimes wholly destroy, the tubular

Fig. 25.



Pyelitis. There was a concretion in the ureter, consisting of phosphates and animal matter.

structure, and abscess soon follows. Infiltration of the submucous cellular tissue with serum is not infrequent. The contents of the dilated renal cavities are usually a mixture of urine, blood, puriform mucus and pus. (*Blennorrhœa*; Rokitansky.)

Gravel or calculi are often found. Perforation of the ureters, from sloughing, occasionally happens; the consequent urinous infiltration either prolongs the sloughing, or produces necrosis of neighbouring bones, or, in fortunate cases,¹ circumscribed abscess.

Chronic cases present a dull-white or slate colour of the mucous lining-membrane. Small vesicles, looking like *sudamina*, are observed on its surface.² There may be sufficient thickening to close the calices. Gangrene but rarely attacks the membrane. Foreign bodies are found in the majority of cases. If, as often happens, they block the ureters, or obstruct, in any way, the urinary flow, there is corresponding dilatation of the renal cavities. The substance of the organs may become involved; and of both simultaneously, or nearly so (*Pyelo-Nephritis*). When not affected, it becomes atrophied, partly from pressure, partly, it may be presumed, from impeded function.

¹ Rokitansky.

² Grisolle.

When dilatation, with destructive action is extreme, an enormous multilocular sac is found, containing calculous matter, urine, etc. The sacculi are formed by the enlargement of the calices, and communication between them is only indirectly effected through the pelvis, which is usually very much dilated.¹ Kidneys, in this state, contract adhesions with neighbouring viscera, and the abnormal cavity may communicate with the tissue immediately circumambient, and with the colon; also with the pleura and lung upon the right side, and with hepatic abscess on the left. Rayer remarks that whilst pure pyelitis tends frequently to involve the renal substance, the converse almost never happens. When recovery from pyelitis has taken place, and subsequent opportunity for necroscopic inspection has been afforded, the affected kidney is found transformed into a fibro-cellular pouch, usually enclosing a calculus. Phosphates, either singly, or with carbonates, are secreted in these cases, by the inflamed mucous membrane, or are deposited from the urine. This deposit finally becomes inspissated, and forms a grayish, or yellowish-white, greasy and chalky pulp, which fills the calices; the kidney thus presents the appearance of a loculated cyst, whose compartments contain the pulp, and radiate from the hilus to the circumference (Rokitansky); there is obliteration of the blood-vessels.

Grisolle, noticing this condition as that wherein patients live with only one kidney, refers to an instance recorded by Chomel in his *Memoir upon Calculous Nephritis* (*Archives de Médecine*²), as one of the most curious known.

Pyelitis from retention of urine, it is said, rarely produces so much pus as that from renal calculus; and naturally, from the fact that the continued presence and dilating force of urine, while irritating and mischievous, are not so to that extent to which hard and angular bodies, in addition to obstruction and dilatation, would lead.

Bony concretions of various shape and texture, laminated, cordate, nodulated, and sometimes amorphous, occupy the membrane, as consequences of the inflammatory process. The ureter sometimes is believed to undergo the fibroid, or cartilaginous transformation spoken of as obtaining in the lining-membrane, although Rokitansky states (1849) that he had not seen it.

¹ See Appendix, Note R.

² 1837.

The formation of a renal concretion, "such as is described by Dr. Prout as the Phosphatic," may thus occur, and greatly aggravate the disordered condition of the organ.¹

Grisolle thinks that instances of pyelitis might be ranged under the title of *Calculous Nephritis*, because their origin from other causes than the presence of calculus, is so infrequent. Since, however, this inflammation does arise from other sources—as from worms, hydatids, retention of urine, vesical catarrh, or tumours, and sometimes from blennorrhagia—its separate consideration, and two divisions, seem desirable. Moreover, the affection, in very many cases, is solely one of the mucous lining of the renal cavity, and therefore distinct from nephritis proper.

Rayer gives four divisions, as mainly comprising the forms noticed:—simple, calculous, blennorrhagic, and gangrenous. *Pyelonephritis* may be both acute and chronic, but assumes the latter character chiefly. Calculous pyelitis is observed at all ages; in the fœtus, in the infant, in adults and aged persons; oftenest at an advanced period of life.

Rayer pronounces renal calculi to be more frequent in females than in males, and says that abortion is almost always induced by their presence. He advised a young girl of eighteen years, who had had pyelitis, not to marry, for the above reason; she however chose to do so, and frequent abortions followed. She had calculi in one kidney when the advice was given.

He counsels nephrotomy in extreme cases only; where abscess of the kidney is undoubtedly existent, and the patient's life endangered.

An interesting case, illustrative of Rayer's opinions, may be found in the *Annales de Thérapeutique*, September, 1846, and also transferred to the *Edinburgh Medical Journal* for December, 1846, whence we extract the above remarks.

Simple desquamative action is also sometimes noticed, the tubuli being found opaque. This is referrible to impeded urinary flow, and poisoning of the blood. Johnson thinks both kidneys are simultaneously attacked, *as the rule*, but the degree of injury differs in them. That unnatural distension, and consequent permanent dilatation alone suffice to induce inflammatory action in the mucous lining of the kidney, is admitted by all good authorities.

¹ The ureter being presumed closed.

Prognosis.—When urethral stricture has been causative of nephritis by retention of urine, having an evident indication, we hope for favourable results, unless great difficulties occur in obviating the obstruction. The character of the latter, and *time*, are the chief elements in making up our opinion. If the case be early seen, and the lesion not very extensive and difficult of remedy, retention is readily cured, and probably all symptoms will rapidly disappear.

More difficult cases, and especially such as give evidence of pyelitis, with extension to the renal substance, and complicated with calculi, are not only unfavourable, but most alarming. Suppuration may rapidly destroy the tissues implicated, and, even in very strong subjects, soon break down the constitution. Or, if the inflammation and destructive action be confined to one kidney, and healing, with consequent atrophy occurs, we have all the risks attendant upon the reliance upon a single kidney—whose task, whilst it is doubled, may likewise be interrupted by disease—when, of course, all is over for the patient.

If the inflamed kidney swell greatly, and the pus be finally voided, a fatal result is to be feared—indeed it is hardly avoidable. If the effusion be inwards, peritonitic inflammation is likely; or, by whatever outlet it finds vent, exhaustion, from the drain upon the system, will probably follow. Grisolle particularly instances the peril when the evacuation is by the intestine, for, says he, “if the kidney, not wholly destroyed, secrete urine, the latter, being continually poured into the bowel, causes ulcerous inflammation of the viscus, thus being a new source of marasmus, and accelerating the fatal termination of the malady.” (*Op. supra cit.*, vol. ii. p. 463.)

Rayer also considers death *certain* when the pus issues as above, or comes into contact with the lungs or liver. Retention of the matter, and the probability of its final discharge in other ways than by the ureter, is therefore more unfavourable than the converse conditions. External issue of the pus is certainly favourable; and although the weakening influence of the discharge is to be dreaded, such cases, even when very unpromising, have resulted in recovery.

All concomitant affections, particularly if of the urinary organs, are of very bad import. If both kidneys are attacked, the case may safely be pronounced irremediable. Symptoms of uræmic poisoning warrant the gravest prognosis.

Treatment.—The removal of the mechanical obstruction, if stricture be the cause, is the first direct object in nephritis from retention.

If the state be only threatened, our measures are the same, the above condition existing. Should it be impossible to overcome the stricture, vesical puncture is demanded, alike from the risk to the bladder, the ureters, and the kidneys, as from apprehension of the toxic action of urea circulating in the blood. The local state offers pressing indications for immediate surgical interference. Under other circumstances, not quite so appreciable, various points enlist our attention. Severe pain, a frequent accompaniment, especially in pyelitis, must be overcome or palliated by opiates. Every attention must be paid to the avoiding of dietetic errors; indigestion will certainly aggravate the difficulties. Excitation of the skin, and sufficient action by the bowels, to assist in clearing the system and the circulation of excrementitious matters, must be instituted. Dry cupping, over the loins, is recommended as a useful local means. This may be supposed not only available against the inflammation, but alleviatory of pain. General bleeding, even, may be necessary. Flying blisters have been advised. (Rayer.)

At other times, and often in the advanced stages of the disease, stimulants and tonics are needed to meet the exhaustive effects of excessive and prolonged purulent discharge, or to obviate the depressing action of urea on the system.

In acute pyelitis, opium will nearly always be required to control pain, and, at the same time, active antiphlogistic treatment must be instituted. Grisolle has had occasion to give opium, both by the mouth and the rectum, and even to the amount of nine and one-quarter grains¹ in from three to four hours, without the superposition of any narcosis.

Acute renal inflammation, here, as always, precludes the use of diuretics; therefore, very large draughts of even bland drinks are undesirable. The object to be attained is twofold; to prevent increase of function, which would demand an afflux of blood to the organ, and, whenever a foreign body is the cause of difficulty, and a ureter is obstructed, to avoid the worse than useless attempt to augment the flow of urine, which cannot escape, and which will momentarily add to the distension of the renal cavities. If, on the other hand, there be no evidence of impaction of a concretion, there can certainly be no objection to soothing, diluent draughts, which, under favourable conditions, *may* dislodge the stone. A similar

¹ "60 centigrammes"—certainly a large amount.

course, modified by circumstances, is suitable to those cases in which we find, by the appearance of pus in the urine, that there is suppurative action. If renal abscess form, and the tumour offer a chance for opening, this should be done as soon as it is likely to be efficient. Nephrotomy, as it is sometimes termed, has been successful in the hands of some surgeons (J. L. Petit, Boyer, Rayer, and others), and has, after a profuse evacuation of pus, prolonged life when despaired of. (Dalmas.) Should a large tegumentary surface become thin, a free incision should be made, and we may thus sometimes evacuate any contained calculi at the same time with the pus.¹

Rayer suggests several methods for opening, viz., incision, incision and puncture, cauterization and incision; simple incision being preferable. Nephrotomy should not be performed when both kidneys are affected, nor when the pus passes by the ureter, nor when incurable disease of other associate organs is declared. When the acute stage has passed, and especially if there has been no external discharge of calculi, we should examine the bladder, and, should any stones be found therein, take measures to crush or extract them. If only one be detected, and that be small, it may possibly be expelled by large draughts of simple water, or of mineral water,² taken fasting.

The excitation of cough, sneezing, emesis, and causing the patient to make sudden movements, when a stone is impacted in the ureter, are, on good grounds, discountenanced by the best practitioners. Rayer has rarely seen expulsion effected by these measures, and it is certain that whilst the attendant efforts would increase pain, if a stone were impacted in the ureter, they would be useless and even dangerous. Dr. Johnson advises against the adoption of any such means, and cautions patients against exercise which tends to irritate or inflame the kidney. We have seen marked instances confirmatory of the wisdom of this advice. When pain has been modified or annulled, it is a question how far the urine may be corrected by

¹ In an interesting case lately reported to the New York Pathological Society, by Dr. Clark, the patient having been also previously operated upon by Drs. Wood and Buck, and having had vesical, as well as renal calculi, a seton inserted deeply in the renal region, where deep-seated fluctuation was detected, had the effect not only of liberating the matter collected there, but also of giving exit to five calculi. (*American Medical Monthly*, September, 1857.) The patient had suffered great agony.

² The mineral waters of Contrexeville are advised by Rayer. These waters are ferruginous—combining tonic and astringent properties.

medication. Various articles have been tried, more or less successfully, for the diminution of the pus. The use of oil of turpentine, cubebs, copaiva, and other similar substances, may diminish the muco-purulent flow; but are open to the objection that they seem to increase the renal pain, or, at all events, cause a more frequent renewal of its attacks. Asses' milk and decoction of flaxseed are the best drinks.

But little success has been derived from chemical resources in combating the tendency to renal calculi, or in destroying them when they exist. Large draughts of certain mineral waters act chiefly by a mechanical influence; and the attempts made to dissolve or disintegrate various concretions by medicines of antagonistic properties, have been, on the whole, a failure. Whilst alkaline drinks have gained a certain reputation in cases of uric acid gravel or calculi; this hardly warrants an extensive or prolonged use of them. Other evils, moreover, would arise from such a course, which would more than counterbalance any doubtful good effects. It has been remarked that in gout, where uric acid is the morbid product, no course of alkaline remedies has annulled its supply. In combating the phosphatic tendency, drinks charged with carbonic acid have been advised and largely given. Opinions have varied as to their efficacy. A temporary amendment may occur during the administration of vegetable acids; but when chronic nephritis is present, the urine will continue alkaline and turbid, and more reliance must be placed upon the treatment advised against the general malady, than upon special chemical measures. In so far as vegetable acids, and the diuretic and chemical action of mineral waters, however slight the latter may frequently be, are valuable adjuncts to the general means at our command, they should never be neglected. Grisolle speaks favourably of the waters of Vichy, Balaruc, and Contrexeville, in calculous pyelitis; while Rayer specially mentions those of the latter place.¹

When the uric acid diathesis is ascertained, digestion, as we have previously remarked, should be carefully watched, and the functions of the skin sedulously maintained; suppression of perspiratory action will increase the acidity and the amount of the urine—

¹ The waters of Balaruc are simply saline; those of Vichy alkaline and gaseous; those of Contrexeville, as already mentioned (p. 259, *note*), are ferruginous; they are cold; others, of similar nature, in France, spring warm, or nearly hot, from the earth.

both, elements of continued mischief. If very acid urine remain long in the renal cavities, it becomes a direct provocative of inflammation, and the tendency to uric acid concretions is augmented. Warm clothing, flannel next the skin, excitation of transpiration by exercise (care being taken not to repel and dry up the moisture suddenly), and occasional warm water—or vapour-baths, are advised. To diminish the excess of acid in the urine, alkaline medicines are certainly indicated, and are often of great service. Early remedial measures, with this intent, are far more sensible than subsequent attempts, with the hope of chemical, disintegrating action, which is too often like "shutting the stable-door when the horse is stolen."

Liquor potassæ, or the carbonate of potash, given either alone or in effervescent form, with a vegetable acid, are the best alkaline remedies, according to Johnson. He and others caution us against a too prolonged use of these medicines. If we render the urine alkaline, or even neutral, we do more harm than good by our treatment. (*Op. cit.*, p. 462.) Soda is objectionable on account of forming a very insoluble compound with uric acid. All alkalies, when too long taken, produce undesirable effects upon the digestive organs. Calcined magnesia, or the carbonate and the sulphate, singly or combined, are safe aperients in these cases. A due regard to the general health must be had in the uric acid diathesis. Where assimilation is imperfect, tonics may prove remedial, and, indeed, are often successful in removing the acid deposit. Iron, in some form, is the most beneficial. (Golding Bird; Johnson; Dalmas.)

When oxalate of lime is deposited, whilst the general dietetic rules above referred to should be scrupulously observed, and will greatly aid in obviating the difficulty, the mental condition is to be regarded. It is a well attested fact that great mental fatigue and over-anxiety, with vexation, in addition to physical exhaustion, are strongly conducive to this diathesis. Every effort should be made to prevent their occurrence. Opiates, to quiet the pain attending the irritation from the presence of these concretions (counteracting their constipating effects by laxatives, as *oleum ricini*, *pilula rhei composita*, *pilula colocynth. comp. c. ext. hyoscyami.*), and, in anæmic states, the preparations of iron, are all of great value. Sulphate of zinc, alone, or in combination with camphor or extract of *hyoscyamus*, one grain of the former, *ter in diē*, with two grains of either of the latter, and gradually increasing this dose every third or fourth day, until eighteen or twenty grains are taken daily

is the remedy recommended by Dr. Golding Bird for excessive nervous irritability. In addition to tonics, cold or tepid sponging is advised, and patients should be warned against eating the sorrel, rhubarb, and similar acescent articles, and against drinking water impregnated with lime (hard water).

In addition to the general remarks above made relative to the phosphatic diathesis, the attention of the practitioner is nearly always called to remedying the enfeebled general health. We have the consenting testimony of all reliable observers upon this point. Not only do we find no occasion for *depressing* treatment, but every indication for a tonic course. Dr. Watson insists upon this in his usual forcible manner. Warning us against depletion, either by bleeding or purging, against salines and alkalies, mercury and colchicum, he urges the great advantages of *tonics*—bark and wine, with muriatic and nitric acids, singly or in conjunction. Of opium he says: "No single drug, probably, has so much power in rendering alkaline urine acid, as opium; and it is indicated for other reasons; it composes the nervous anxiety to which these patients are mostly a prey." Freedom from anxiety and care, and the avoidance of every debilitating habit and of excessive bodily fatigue, are also inculcated by this judicious physician. Sexual excitement and connection should be avoided, and, indeed, excess of any kind, even if the physical condition allow indulgence. Dr. Johnson strongly recommends the muriated tincture of iron, to which are sometimes added a few drops of muriatic acid. He advises ten drops of the former with the same quantity of the tincture of henbane, or in infusion of calumba, with syrup of orange-peel. The best time for its use is soon after eating.

Treatment during the Time a Calculus is traversing a Ureter.—The frequently excruciating suffering experienced during the passage of a renal calculus downwards, demands the most prompt and thorough measures for its relief. If the pain be only moderate and soon remit, hot fomentations may answer the purpose, and the use of pounded ice, locally, has been advised (Prout; Druitt); but with caution, against the intolerable burning sensations often so annoying. The *warm bath*, however, even to faintness, is frequently requisite. The syncopic condition, or an approach to it, by "relaxing the spasm of the ureter, contributes to the passage of the concretion, and, at the same time, lessens or removes the pain. Large enemata of warm water are often exceedingly efficacious,

and opiates may be administered by the rectum if not tolerated by the stomach. When borne, however, opium, in sufficient quantity to quiet the pain, should be given. The copious imbibition of bland liquids, by way of acting against the concretion by a *vis à tergo*, is recommended. An active purgative is sometimes successful towards dislodging and urging on the stone. Exercise, cautiously used, may also assist the process.¹ Great hygienic precautions should for a long time be observed; the bed should be cool and rather hard, dampness avoided, and every means taken to confirm and guard the health. As great exhaustion often follows the final dislodgement of the renal calculus from the ureter, this condition must be promptly met by proper restorative measures. When the calculus has become vesical, its management, as we have already hinted, will be mainly surgical, and belongs to another department of our subject. The nephralgic attacks, described by Sir B. Brodie and others, and chiefly noticed in gouty persons, are best treated by purging and colchicum.

VII. TUBERCULAR OR SCROFULOUS DISEASE OF THE KIDNEY.

This affection is found in both adults and children, and its etiology is of course referrible to that dyscrasia which similarly manifests itself in other organs. Infrequent at best, its diagnosis is a matter of great difficulty, and we can but suspect its existence in most cases. Where softening and disintegration of the tuberculous deposit have taken place, the microscope generally reveals the fact with some degree of certainty, though less available by far than in many other renal diseases.

Generally, the other viscera, or many of them, participate in the disease, and certain of them are far more largely affected. The lungs are almost invariably thus diseased, and perhaps in a majority of cases the kidney has been affected last, and not infrequently by a sort of propagation from the other portions of the genito-urinary system.

If the tuberculous diathesis exist in an individual, it is very likely, as Dr. Barlow has lately said, to be at some particular moment directed with more force towards any organ whose vascu-

¹ Druitt.

lar and functional activity are the greatest; and tuberculous deposits will consequently take place in such organs at such times. It would seem that adults are more often affected with tuberculous kidney than children;¹ at least it is in advanced childhood particularly that the *abdominal organs* are affected with tuberculosis, and it is well known that the *brain* is chiefly so in early years.

This is Rayer's opinion, who, in his large experience, only twice saw renal tubercle in children (*i. e., infants*). Jones and Sieveking state the middle period of life to be that of greatest frequency; but Grisolle and Rilliet and Barthez declare the opposite.²

The years after puberty would seem, analogically, more obnoxious to the malady than an earlier period. In a majority of the cases observed by Rayer, *one* kidney only was attacked;³ in seven out of ten cases, the *left* kidney was the one diseased.

Dr. Bence Jones showed two kidneys to the Pathological Society of London, in 1849, the right, tuberculous, the left, disorganized by fatty degeneration; the patient was a girl of seventeen years, of very scrofulous aspect, and stunted in growth.⁴

Morbid Anatomy.—External Manifestations.—Generally, the organs are not enlarged by the tuberculous deposit. In gout, out of sixteen cases, no increase of volume was found by Rayer; and in two out of the same number, there was diminished size. Sometimes, when obstruction of a ureter occurs, or when that canal is narrowed throughout, and its walls thickened and ulcerated, great dilatation follows, so that, in thin persons, the tumour thus formed is quite perceptible on palpation. Rayer only twice saw the investing capsule participating in the disease.

Seat of the Deposit.—This is quite equally distributed; the cortical substance showed it 16 times in 16 patients; the medullary portion, 15 times; the mucous membrane of the pelvis of the kidney, and of the ureter, 13 times. (Rayer.) Generally, the tuberculous disease follows the ureter from the kidney, provided it does not originate in the bladder, and pass thence upwards. Often, the deposit is nearly simultaneously manifested in these organs.

Course and Structural Changes.—If the calices and pelvis be first affected, they are finally much dilated, intrude upon the medullary

¹ Barlow.

² This may be peculiar to French, or especially to *Parisian hospital* children.

³ Grisolle concurs, but says that *both* are usually affected in *children*.

⁴ Quoted by Johnson.

cones and approach the surface of the kidney; the renal tissue is consecutively attacked. Both the miliary and conglomerated tubercle are found. The larger masses usually conform to the shape of the parts into which the deposit is infiltrated. Hyperæmia accompanies the miliary granulations; pallor of the surrounding tissue is noticed when the affection is chronic. "The large masses extending through the diameter of the organ, from the surface to the hilus, are remarkably bloodless." (Jones and Sieveking.) Johnson speaks of the strong line of demarcation between the tubercular deposit and the surrounding tissues, and of the consequent difficulty of tracing "the transition from the normal to the diseased state."

Microscopically, the masses deposited in the renal cortex consist of an amorphous, "finely granular" matter; occasionally, broken uriniferous tubes are seen, the portions filled with the same fine, granular substance. The epithelium of the tubes, in the parts surrounding the tuberculous deposit, is opaque, presenting a granular aspect, and sometimes an *oily* appearance, with occasional traces of desquamation. The granular, amorphous material found within the tubes is believed to be first deposited there, rapid destruction of the tissues soon resulting from it. (Johnson.) Firm when deposited, *softening* often takes place in renal tubercles. The rarity of pus-corpuscles in them is mentioned by several authors; they are thus not likely to be mistaken for small suppurating points of tissue. With the advance of the disease, the tuberculous deposit runs together into large collections. These often occupy the precise limits of a lobular division of the kidney. The softening is frequently extensive, the whole gland sometimes melting down into disorganized matter. The kidney becomes an irregular cyst, or a set of cavities divided by *septa* of "thickened areolar tissue," occupying the situation of the original fissures between the lobes of the embryo kidney.

When pervading the medullary cones, the deposit is either in the form of granulations or of large masses. A *bead-like* arrangement of the former has been remarked.

Pressure upon the cones by retained urine, or their ulceration, and more or less extensive destruction, next occur. The downward extension of the malady to the ureter, thence to the mucous coat of the bladder, the urethra, prostate gland and vesiculæ seminales, is fully as easy as the converse progression. Johnson states that the

deposit is often found in the three latter situations, even when the vesical mucous membrane is only slightly affected.

Prognosis.—From the nature of the constitutional taint, the worst is to be feared in scrofulous or tuberculous kidney. Moreover, the local degeneration is in itself nearly always of destructive and fatal tendency. If no vital organs (as the lungs) be appreciably attacked, there is some reason to hope for a more favourable result.

Treatment.—It is obvious that our present resources allow of no *specific* treatment for renal tubercle. Improvement and confirmation of the general health is the main indication. Nourishing diet, tonics, out-of-door exercise, and the strict observance of hygienic precautions are to be directed. Cod-liver oil is recommended, and it is a question how far the use of whiskey, now so much in vogue for tuberculous patients, is justifiable. Of course, this must vary with circumstances; if, on trial, the patient digest it well and obviously improve under its use, we should hardly be justified in not persevering in its administration.¹ Like that of many new methods, the present lustre of this may become dim, but there are certainly many instances of tuberculous disease where we have witnessed an improvement not justly attributable to any other means, and of such extent and persistence as to arrest the attention of even the unprofessional. In many cases, much might be hoped, if by this or any other remedy, the patient's strength could be kept at or near its average standard.

Over-treatment by drugs is worse than useless. The command to "throw physic to the dogs" comes loudest, in tuberculous cases of all descriptions, from physicians themselves. A cool, dry atmosphere, and the country which oftenest presents it, would better fulfil than any other, expectations entertained of benefit from a change of climate. Whatever debilitates, must be unfavourable.

When pain occurs, the warm bath and opium are advisable; *renal* pain is often quieted by hot and opiated fomentations. Preparations of steel, and of iodine, are often very serviceable.

¹ Unless the action were unfavourable upon the kidneys by inducing excessive diuresis, or otherwise.

VIII. CANCER OF THE KIDNEY.

General Pathological Observations.—This disease, according to most authorities, is even more rare than renal tubercle, and far more so than cancer of the stomach, liver, or intestine. Jones and Sieveking, however, although they confess a paucity of data, affirm that "renal cancer is certainly not rare." It is far more uncommon than any form of nephritis, and than Bright's disease. Most frequently observed as a consequence of, or associated with similar degeneration in neighbouring organs,¹ it has been found in the kidneys alone. Sometimes cancer of the stomach or liver has been the immediate antecedent, or more remote viscera have been first affected. The disease is occasionally latent, the urine often remaining for a long time unchanged. The *encephaloid* is the most common form. (Walshe.) The hæmatoid variety of encephaloid is thought more frequent in the kidney "than in most other internal organs" (Johnson.) Melanotic infiltration of the cancerous masses is rare. Old age is most obnoxious to the disease.² Some observers think it more common in men than in women, and in the right kidney than in the left. It has been suggested that the frequency of hepatic cancer, may, by contiguity, contribute to this result. The coexistence of the disease in the liver and kidney noticed as very common by Rayer, is also remarked by Walshe; as also that of the neighbouring portions of the stomach and descending colon.

Morbid Anatomy.—The cortical substance, as the rule, is first attacked. This, indeed, is true of nearly every form of renal disorder. Extension to the medullary portion is common, and the pelves, with the ureters, are occasionally involved. The abnormal product is at first as hard as the renal substance, but softening ensues, and the term *encephaloid* is well sustained by the brain-like masses found. Still later, a nearly fluid condition of the latter exists. Between the affected parts, there may be entirely healthy kidney, or more or less congestion, even inflammation and purulent

¹ It is believed most frequently to follow the same affection in the *testis*; its coexistence in the latter, and in the bladder, at the same time with the kidney, is pointed out by Rokitansky and others.

² Dr. Walshe (on Cancer) states the period of greatest frequency to be that between 50 and 70 years.

deposition may follow. The investing capsule of the kidney is usually thickened.¹

The form and size of the kidney may, or may not, be much changed. The amount of cancerous disease regulates this. It has been noticed that encephaloid renal growths are especially large in children. Jones and Sieveking refer to a case related by Dr. T. K. Chambers, where the weight of the tumour was three-fourths that of the entire body!² Occasionally the organ is enormously enlarged and deformed by the morbid deposit. A case is cited by Johnson from the *Proceedings of the Pathological Society of London* (p. 119), in which the weight of cancerous kidneys in a child thirteen months old, was five pounds. Their surface was smooth in this instance, but far more frequently there are irregularities or nodosities of all sizes, from that of a nut to that of an orange. The tumours may all be near the convex border of the kidney, the lower half being, sometimes, wholly free from them. Occasionally, they project into the renal pelvis.

If the organ be thoroughly infiltrated with the product, its form is wholly lost and its structure broken up. There are, occasionally, cavities in the cancerous masses, containing fluid cancerous matter and altered blood, which will now and then escape into the renal pelvis, and be discharged with the urine; diagnostically, a phenomenon of great value. The *lymphatic glands*, both in the hilus of the kidney and around the organ, often partake of the diseased action. The *renal veins* have been found filled with fibrinous coagula, and even the inferior *vena cava* has been known to share in the affection.³ A deposit of matters similar to that found in the kidneys is sometimes mingled with the coagula just mentioned. This affection of the veins, says Dalmas, although seen in other forms of cancer, and when the latter is seated in other organs, is very frequently noticed in connection with the renal form:—"Le cancer du rein est remarquable sous ce rapport."

Scirrhus cancer is occasionally found in the kidney, and, at other times, masses of degenerated tissue, infiltrated with "serosity, albumen, blood, and gelatiniform mucus." (*Auct. ante cit. Dict. de Méd.*) Jones and Sieveking state that scirrhus and colloid of the kidney "are rarely, if ever, found."

¹ Grisolle.

² See Appendix, Note T.

³ Berard aîné. Velpeau. Cruveilhier. Dalmas. Grisolle. Johnson.

With regard to the proportions in which the organs are affected, Dr. Walshe saw *both* diseased 16 times in 35 cases; the right kidney, *singly*, in 13 instances; the left in 6.

Prognosis.—The affection is, of course, incurable. Besides that we have nothing to oppose to it, successfully, when once established; the *diathesis* is a most disastrous one. The complications it entails are in themselves often sufficient to cause death; and the malady runs a rapid course—the mean duration of six cases noted by Dr. Walshe being only eight months, or “two months and a half less than that of encephaloid disease of all organs indiscriminately.” (*Op. cit.*) Hæmorrhage may come on violently, or may, gradually, by slighter losses, weaken and wear out the system, and sometimes, by blocking a ureter, occasion obstruction of the flow of urine, with its attendant evils. Pain is often extreme, and powerfully depressant. The knowledge of his disease also dispirits the patient, and the mental and physical reaction progressively aggravate his condition. To obviate this effect, Rayer has suggested the employment of remedies insignificant in themselves, except by diverting the attention, it being intimated to the recipient that a gradual effect is being produced by them. This kindly meant deception may be efficient in a limited number of cases, and in so far as it effects the intended purpose, is justifiable.

Treatment.—Palliatives for pain will be demanded in nearly every instance. Opium is the most reliable means: “le seul remède vraiment utile,”¹ and should, on occasion, be freely used. Frequently the entire list of its best preparations must be gone through, and the method by injection, with the endermic mode also, resorted to. Belladonna-plaster to the loins, hot or warm baths and fomentations, chloroform locally, and mild counter-irritation, may all be put in requisition, and often successfully. To bleed patients for the relief of pain, even by cupping and leeches, would be bad practice, because the blood is already greatly impoverished, and we should aggravate the difficulty.

Hæmorrhage must be met by prescribing the recumbent posture, rest, and astringents by the mouth. Gallie acid, tincture of the muriate of iron, and, at the same time, cold applications, and especially ice, locally to the loins (best in a bladder), are the chief means for arresting the flow. Should there be large accumulation of

¹ Rayer.

blood and fibrinous clots in the bladder or urethra, catheterism and injections may be required.

The general treatment must be that best suited to fortify the health and keep up the strength. A nutritious diet and certain tonic medicines meet these indications. Iron in some form is a favourite remedy (iron filings, the lactate, and subcarbonate).¹ Whatever of this nature agrees well with the stomach should be resorted to. Arsenic, iodine, conium,² belladonna, with regard to any special efficacy they exert, are quite as powerless in the treatment of renal cancer "as in that of every other degeneration of the same nature."³ Of conium, Rayer says its preparations have been too much praised, and they also offer serious objections. They injure the functions of the stomach.

The cautery and the moxa, to the lumbar region, are repudiated by the best authorities, as not only inefficacious, but aggravating the patient's sufferings, preventing sleep, and often rendering decubitus painful, and movement nearly impossible.⁴ In ascitic complication, the usual remedies may be used with caution, unless some particular contra-indication exists. Light diuretics and mild purgation may be tried. If the patient be very feverish, moderate abstraction of blood is admissible; it is best done by leeching, although some advise general bleeding. (Dalmas.) Great caution is necessary, and the step should not be taken except on pressing necessity. Partial peritonitic inflammation, with pain around the renal tumour, and hæmaturia, with fever, justify it; but even then it should not be resorted to until after full trial of baths, emollients, and narcotics, topically. (Rayer.)

IX. HÆMATURIA.

Etiology.—The causes of essential hæmaturia are often obscure. When diagnosis informs us of its *source*, we may possibly detect the immediate exciting action; more rarely, the remote cause.

It is natural to suppose that the sanguine temperament, joined with excesses either in the drinking of liquors or in too high living generally; in venery, prolonged sedentary pursuits, and any occupations or habits whereby a greater amount of blood is solicited to

¹ Rayer.

² *C. maculatum*.

³ Dalmas.

⁴ Rayer.

the parts concerned in the expression of the symptom, predispose to its manifestation. Those living in warm climates are especially liable to it. It is endemic¹ among young people in the Isle of France, and the French soldiers in Egypt were, according to Renoult, often attacked by it.

Symptomatic hæmaturia is, of course, more easily traceable to causes. Wounds of the organs (kidneys, ureters, bladder, and urethra), their inflammation² and ulceration; the presence and especially the passing of calculi; fungous masses, especially at the neck of the bladder or upon its inferior wall;³ cancerous degeneration and vesical varices, are so many distinct agents in producing bleeding from the urinary organs. Bloody urine is also a frequent accompaniment of enlarged prostate.⁴ The bleeding may be simple or provoked by some instrument. A peculiar class of diseases is accompanied not infrequently by hæmaturia: viz., those in which there is a typhoid condition of the system, a depressed state, or impoverished and poisoned blood. Malignant fevers, variola, scarlatina, and scurvy, exemplify this. Gouty irritation or inflammation of the ureters is mentioned by Dr. R. B. Todd. Typhoid fever sometimes manifests the symptom, always a grave one.

Hæmaturia termed *idiopathic*, has its examples in such cases as are met with after prolonged horseback exercise, and other great fatigue; after violent purgation, or the use of cantharides. It is often, however, wholly spontaneous. Sometimes, though very rarely, it is supplementary of other suppressed sanguineous discharges, as the hæmorrhoidal, and especially the menstrual flow. Chopart has related a case of this kind; bleeding from the urinary organs occurring in a woman whose menstrua were irregular, and thus alternately for three or four months, when the menses reappeared. This process went on for 18 years. Authors recognize a critical effort of nature, thus expressed, in certain diseases, and we think we have seen such instances. It is not, we believe, necessary that a malady be very grave, that this be observed.

The vast majority of cases of hæmaturia are symptomatic. Grisolle and Watson cite the statement of Cullen, that although he did not deny the possibility of idiopathic hæmaturia, he had never seen

¹ Grisolle.

² Phlegmonoid, of the kidney; or pyelitis, involving the ureters. (Todd.)

³ Raige-Délorme.

⁴ Thompson on the Enlarged Prostate, London, 1858, p. 133.

an instance,¹ nor, adds Watson, had any of his friends. P. Frank, says Délorne (*Dict. de Méd.*), met with only a very few cases, in an extended practice. Watson had seen only one instance, and he believes that very many obscure cases are referrible to renal calculi, and that, therefore, the number of alleged idiopathic examples should be diminished. Heberden found this very often true, and generally referred hæmaturia to stone. (*Commentaries*, edit. Bostoniæ, 1818, p. 385.)

Vesical hæmorrhage may arise from simple ulceration; from malignant disease; from inflammation by passive exhalation; from irritation of the mucous coat by retention; from stricture; and sometimes from the action of unhealthy urine on the mucous coat of the bladder. This latter form is often accompanied by more or less purulent discharge. With vesical calculus, we sometimes have hæmaturia.

Divisions.—Hæmaturia, properly, is a discharge of blood from the kidneys, ureters, or bladder. The bleeding noticed after accidents to the urethra, or after gonorrhœa, is not included under the term, because the blood usually flows off slowly and steadily, or else comes away *guttatim*, and is not mixed with urine; at all events, bleeding continues in the intervals of urination;² sometimes, however, being prevented from issuing by some obstruction in the urethra in front of the wound or bleeding point, it flows back into the bladder, and is then passed with the urine.

The different methods of recognizing the source of the bleeding pertain to diagnosis. There is often extreme difficulty.

Morbid Anatomy.—If the hæmaturia be idiopathic, no lesion is remarked upon the mucous lining surfaces of the urinary passages. (Grisolle; *op. cit.*, et *alii.*) When symptomatic, we find certain injuries attaching to the malady, whether local, or such as act through the medium of the blood upon the organs. *Calculi* and *carcinomæ* are the most frequent discoveries, explanatory of the bleeding. *Farix* is often noted, especially when near the vesical neck, as productive of serious hæmorrhage. The traces of acute and chronic inflammation, the latter more frequently, are found *post-mortem*, in many instances, as we have already seen.

Duration and Termination.—Hæmaturia may continue for some

¹ Rayer thinks this statement of Cullen rather too positive and broad: "Mais Cullen est allé trop loin lorsqu'il s'est ainsi exprimé." (Vol. iii. p. 301.)

² Which is sufficiently distinctive.

only, or for one or two days. These are the idiopathic cases. More frequently, it lasts for days and months. We are not to suppose that a continuance of the symptom for several consecutive years is necessarily due to successive exhalations; it may be, that the urine gets its colour from the gradual dissolution and passage of a clot, with it, from the urethra.

Death is very rare by symptomatic or idiopathic hæmaturia; it is, *immediate* death—(Rayer has an example). That the patient is often worn out, in great degree, by a long-continued drain, as in cancerous disease, is doubtless true.

Hæmaturia recurs in a similar manner to other hæmorrhages.

In the few instances of supplementary hæmaturia, a periodicity is noticed. In that which follows blows on the loins, frequent recurrence, at very long intervals, is noticed.

Dr. Elliotson observed intermittent hæmaturia.

Consequences.—Abundant bleeding from the urinary passages sometimes furnishes a clot of sufficient size to obstruct the neck of the bladder and cause retention of urine. Worse than this, the ureter may be blocked, and the blood and urine be retained in the pelvis of the kidney. A tumour may be formed from this cause, perceptible to the touch. Usually, ureteral obstructions of this sort are only temporary, the clot being washed out by the flow of water. Symptoms analogous to the pain of a calculus passing down the ureter (*nephralgia*) accompany the latter class of cases.

Fibrinous moulds, of the shape of a lumbricus or of the strongylus gigas, occasionally giving rise to the idea of the presence of these parasites, are seen. Sometimes, nephritic symptoms are observed. The concretions mentioned are often furrowed. The fact that clots retained in the renal pelvis, or in the bladder, occasionally become nuclei for calculous formations, is well known.

Prognosis.—This will depend upon the abundance, duration and source of the hæmorrhage. If obstinate, it may at last weaken the patient excessively; if resulting from the presence of a calculus, prognosis is unfavourable; the same is true when serious structural lesion has taken place, as from degenerative processes.

Supervening in the course of adynamic, malignant, pestilential, or eruptive diseases, the symptom is of the most grave import.¹ In

¹ Sydenham. Diemerbroek, *et al.*

typhoid fever, we have remarked a rapid sinking after its occurrence, and in variola it is considered nearly always a fatal sign.

More favourable augury may be given in cases which are slight both as to quantity and duration—and which are not referrible to the causes just enumerated. It may be reasonably concluded that in certain instances moderate hæmaturia affords relief to the organ furnishing the blood, and is therefore a salutary effort. The symptom is one which greatly (like all hæmorrhages, especially if sudden) alarms the patient, and instantly arrests the physician's attention. Too much stress should not be laid upon the mere bleeding, prognostically; but our opinion legitimately and chiefly rests upon the *source* and *quantity*.

Treatment.—The immediate indication is to arrest the bleeding when profuse; or *more safely*, often, to modify, and gradually stop it. But the chief attention must be directed to the constitutional state, and to the removal, if possible, of any recognizable cause.

If hæmaturia be symptomatic of acute renal disease, and become excessive, the remedies best suited to the case are rest in the recumbent posture, and best in bed, together with moderate local bleeding by cupping or leeching. Dr. Johnson states that he never saw "a case of acute renal disease in which the hæmaturia required special treatment." Astringent medicines are rarely needed in this class of cases.

In bleeding from malignant disease, or even from calculi, astringents are very proper. Gallic acid, by almost universal consent, has obtained high favour with practitioners. Dr. Watson, speaking in praise of this remedy, says, we may conceive, therefore, that it stays internal hæmorrhage by exerting its astringent property on the capillaries. Five-grain doses, frequently repeated, are proper, and it is best taken in a mucilaginous mixture. The tincture of the muriate of iron has also proved exceedingly useful. Its action is diverse, it being directly astringent in certain cases, and in others proving corrective of the alkaline condition of the urine, which by its irritating qualities has excited the bleeding.¹ Oil of turpentine is of service in cases where the hæmaturia is passive—occurring as it were by exhalation. The existence of inflammation should preclude its use; and vesical hæmorrhage is more properly treated by it than renal.

¹ The *Trillium Atropurpureum* has been highly recommended in hæmaturia. Dose, 3j to 3iss, pulverized, in syrup.

In bleeding from the urinary organs consequent upon the ingestion of irritant articles of food, or of medicines (turpentine, cantharides, etc.) possessing a like quality, diluents must be freely used. When pain is excessive, opium will be needed. Grisolle directs the combination of camphor and opium, in addition to warm baths and bland drinks. If it be believed that irritating matters still remain in the stomach or bowels, castor oil may be given with advantage.

Hæmaturia from violence, such as blows over the lumbar region, demands entire rest in bed, and plain food, of a digestible nature; no stimuli should be allowed, and no diuretic substances or drinks administered. The organ affected must be relieved from the performance of its functions, so far as is possible. If the bleeding be *prostatic*, a change of the size of the catheter or sound, should one be left in, or merely passed, may prove sufficient. A change from an elastic to a silver one is also advised; and quietude in the recumbent posture; with gallic acid, sulphuric acid and opium.¹

When morbid urine has irritated the bladder and caused hæmaturia, or when the bleeding is owing to retention of urine, surgical aid is called for in the latter state, and medicinal interference is required for the former condition. If a stricture be the prime cause, it must be freed, or in the event of the impossibility of attaining this end sufficiently soon, or at all, vesical puncture will be demanded. Against the difficulties arising from a morbid state of the urine, the measures previously advised to correct the peculiar diathesis existing, are to be put in force. The digestive organs have special claim upon our attention, and all hygienic rules greatly assist us.

It is important to maintain solubility of the bowels, but all violent purgation is inappropriate. Enemata of a mild nature are of service, and the action of fomentations to the loins and abdomen, seems often an adjuvant to their operation. It is well known that the urinary flow is frequently thus induced, and where there is a tendency to retention, this is important. Of course, during an active hæmaturia, the applications should be cold. This is also true in the passive hæmorrhages; and, in extreme cases, slightly astringent injections may be thrown into the bladder, if it be decided that

¹ Mr. Thompson (*The Enlarged Prostate*, etc.); who also quotes Mr. Adams (*Anatomy and Diseases of the Prostate*, 1853) as recommending *alkalies* in these cases—the carbonates of soda and potash, in small and repeated doses.

the bleeding is vesical. Frequently, cold enemata are found arrestive. In a case of vesical hæmorrhage, where slight subacute inflammation seemed to exist, we lately found great advantage from the use of ice, inserted well up in the rectum. This is a recommendation of Dr. Gross, and merits trial in similar cases. The application of cold lotions and ice upon the abdomen, around the loins, perinæum and upper parts of the thighs, has long been practised.

Clots in the Bladder. Treatment.—Great irritation is almost sure to arise from the coagulation of blood within the bladder. Whilst we are compelled to employ antiphlogistic measures, the necessity for removing the cause of the difficulty is urgent. A large-sized catheter must be introduced, with apertures sufficient to allow the clots to be washed out with the liquid blood and the urine.

Several writers notice the admirable directions given by Dr. Prout relative to this condition. When vesical hæmorrhage has been profuse, or blood from any source has largely accumulated in the bladder, no better course than his can be suggested. He recommends "a large-eyed catheter, and an exhausting syringe, by the aid of which, and the occasional injection of cold water, the coagula may be broken down and removed." A repetition of the hæmorrhage and distension of the bladder should be met by cold water injection into the rectum and bladder; or, as we have previously suggested, by the use of ice in the rectum. Dr. Prout tells us that if these means fail, "from twenty to forty grains of alum may be dissolved in each pint of water injected into the bladder—a remedy that seldom fails to check the bleeding, even when the cause is malignant disease. I have never known unpleasant consequences follow the use of this expedient, and have seen it immediately arrest the most formidable hæmorrhage when all other means have failed, and when the bladder has repeatedly become again distended with blood almost immediately after its removal."

With regard to this catheterism and vesical injection, Raige-Délorme, long since, advised nearly the same procedure—directing, however, warm water to be thrown in—doubtless with the idea that it would dissolve the clots more readily than cold. But the advantage thus gained must be counterbalanced by the probability that the warmth of the injection would rather favour the bleeding, if the latter be vesical. The cold water is therefore better suited to the purpose, and the action of the syringe is usually forceful

enough to dissolve the concrete blood. Délorme, in common with many others, counsels the plentiful use of bland drinks, in aid of the latter process.

When the bladder is *full*, however, the absurdity of endeavouring to inject it is apparent—and this has arrested the attention of many practitioners. Perinæal section has been advised in these cases—(Severinus, Astley Cooper, *et al.*) Grisolle, referring to this, remarks, that the operation is unjustifiable except there be stricture or other obstruction of the urethra, not capable of being promptly overcome. He commends the procedure devised by M. Leroy d'Etiolles as being simple, easy and efficacious. This consists in breaking down the clots by means of a catheter without any stylet—or by a sound¹—and the repetition of this as often as necessary to entirely empty the bladder.

Other means, we conclude, are to be used in the intervals. M. Leroy succeeded in evacuating *two kilogrammes* of coagulated blood in this manner, without any injury or pain resulting from the introduction of the sound, "more than one hundred times within a few hours." (A *kilogramme* is 2 pounds, 8 oz., 1 drachm and 14 gra. Troy weight.—Avoirdupois = lb 2, oz. 8, dr. 5.)

Hæmaturia which evidently depends on climate, unhealthy residence, etc., is of course best remedied by change of both, when practicable. Grisolle, speaking of the hæmaturia endemic amongst very young subjects in the Isle of France, recommends *emigration* as a last resource. Previously, iron, if the constitution is weakened by the bleeding—alkalies to correct the uric acid diathesis—and tincture of cantharides if the urine be chylous, albuminous or fatty, have been found useful. The balsamic preparations should also be tried. It would seem that the emigration, instead of the last, might fitly be one of the first measures adopted—as a temporary absence might cure, and if it did not, a permanent one would be peremptorily demanded. Medication alone, under such circumstances, the cause being known and persistent, is mere temporizing.

Attention to hygienic precautions, and the avoidance of the causes of hæmaturia, are all the more imperative in providing against its recurrence. Plethora must be obviated, as far as possible, by dietetic provisions, and, if imperatively demanded, local or general bleeding must be directed. A due regard to the state

¹ Gum-elastic sounds—but inflexible, says Grisolle, as respects their curve—"à courbure fixe, sans mandrin." (*Op. cit.*)

of the bowels is highly important, and violent exercise must be taken. The writer has quite lately met with two cases—one recent date when seen, the other of longer standing, in which in bed, with mucilaginous drinks and local bleeding (the latter one patient only), were promptly successful; the patients were females.

Renal apoplexy, noticed at considerable length by Rayer, occurs without giving rise to hæmaturia.

CHAPTER IV.

DISEASES OF THE URETERS.

THE morbid conditions of these canals are principally such as arise from dilatation following obstruction. In rare instances, there is *obliteration* of a ureter, after obstruction and dilatation involving the pelvis and calyx of the kidney; and subsequent atrophy of the latter, with suspension of its proper secretion.

Inflammation of the internal ureteral surface happens, but less frequently than that of the lining of the renal cavities. There is usually a degree of thickening of the coats of the ureters, concomitant of inflammation, and something of this is remarked in connection with simple dilatation.¹

Urethral stricture, causing, as it frequently does, vesical inflammation, may thus be the means of extending a similar condition backwards along the ureters, which, according to certain authorities, are predisposed to it by the *fact of dilatation*; at any rate, it not infrequently accompanies the latter condition. The prolonged contact of unhealthy urine increases the liability to inflammation. Obstruction may be seated near the vesical orifice of the ureter; it sometimes exists higher up.

Swelling, injection of a deep-red colour, and a villous aspect of the mucous lining-membrane are observed; and pus, or muco-purulent secretion bathes the surface; in extreme cases. The ureters sometimes slough, and by their consequent perforation, infiltration of urine into the surrounding tissues will either produce extensive sloughing therein, or give rise to abscesses, and induce the gravest condition.

Phosphatic concretions, or a mixture of these and of carbonates, are either formed from the urine, or secreted from the diseased mucous membrane. (*Vide* Pyelitis, pp. 253-5.)

¹ Jones and Sieveking.

When dilatation is extreme, so that the ureter resembles the small intestine as to calibre, there is hypertrophy of its coats, and its *length* is also increased, so that it is thrown into *coils*, instead of being straight. (Roux; Rokitansky.) Here, we have an additional element of disease, or, at least, of its aggravation. From the inequality of the thickening at different points, the external cellulofibrous tissue accumulates at the narrowest portions of the ureter, during the dilatation, offers resistance, and causes *flexure* at these points; the tube rotates there upon its axis, lessening its capacity still more, and of course adding to the obstruction.

To the inflammatory states communicated from other portions of the urinary organs, Rokitansky has added an "exudative" form, which, however, is very rare, and, according to him, always secondary. He never saw "a case of idiopathic croup of the urinary organs."

It has been found in connection with typhus and the exanthemata (especially variola and scarlatina), with diphtheritis and tuberculosis, and in purulent infection of the blood. The putrid disorganization of the latter fluid has been very often accompanied by it. A hæmorrhagic exudation upon the affected parts is then observed, with dark-coloured or red patches, and "sanguineous infiltration, friability, and solution of the mucous tissue, and hæmorrhage." This may be isolated, or widely diffused, and gangrene often accompanies.

Morbid Growths—Concretions—Degenerations.—As a consequence of chronic inflammation, fibroid or cartilaginous formations are found in the ureters, although Rokitansky says he has never seen an instance.

Cysts occasionally present themselves. Two instances detailed by the latter observer were seen in the Vienna Hospital. The size of the cysts was from that of a millet-seed to that of a pea; they were developed just beneath the mucous membrane, singly and in groups; their contents were a serous fluid, yellowish, or colourless, and either a soft, glutinous, or else a hard nodule, of varying size, and resembling amber or horn.

These cysts sometimes burst, and discharge their central concretions into the bladder. In the above instances, they were found chiefly in the ureters; in one case, in the pelves and calices of the kidneys.

Tubercle in the submucous cellular tissue of the ureters has been

observed, even when the kidneys were healthy, although most frequent when they are similarly diseased. Rokitsansky states that "it is always a symptom of tubercular disease, that has spread from the male genitals to the urinary organs." Jones and Sieveking, however, believe this not necessarily the case. They refer to instances recorded in the *Transactions of the Pathological Society*, and to cases observed by themselves, in support of their opinion.

Tubercular disease of the lung, or of the hip-joint, is very commonly an adjunct. The deposit appears beneath the submucous tissue, and is found in an acute and a chronic form. In the former, there are large patches of tubercle; the mucous membrane is wholly infiltrated with it, and it "is at once detached as a cheesy, purulent mass."¹ The chronic form shows us gray granulations, some of which turn yellow, become softened, and are succeeded by small circular ulcers, rarely larger than a pea or a bean.

Cancerous disease of the ureters is very rare, and almost never occurs *primarily*. Rokitsansky asserts that it never affects the mucous membrane of the urinary passages, except it be developed in other organs simultaneously. Whilst the renal calices and pelves are diseased consecutively upon cancerous degeneration of the body of the kidney, the ureters are apt to be so after vesical or uterine cancer has commenced.² Contraction, and sometimes complete closure of the canals may follow.

Etiology.—This has already been partially stated. To collect the chief causes, we have *obstruction*, more or less distant, on the vesical side of the ureter, very often at, or near the opening of this canal into the bladder. This may be from urethral stricture, or from closure of the canal itself. 1. By clots of blood, calculi, or thickening of tissue, and twisting of the tube. 2. By the compression of a tumour, or of the gravid uterus upon it; by constriction from cellulo-vascular bands developed in the abdomen; by adhesions. 3. From the results of inflammatory action. These comprise the majority of appreciable causes. Their results are *dilatation*, *contraction*, and sometimes actual and entire *closure* throughout—obliteration.

Blocking of the calices and pelves by cancerous growths, nume-

¹ Rokitsansky.

² A case of *uretero-uterine fistula* is recorded by Dr. H. A. Trifet, *Thèses de Paris*, No. 207, 1845; also *Archives Générales de Médecine*, Juin, 1846.

rous morbid states of the bladder, the prostate and urethra are mentioned by Rokitsky as obliterating causes.

Prognosis.—In the majority of cases, certainly unfavourable. There is more chance for the patient, if only one ureter be affected. Much depends on the nature of the particular affection. The inflammation, pain, etc., attendant on passing calculi, are happily often only temporary, like their cause. If firm impaction of a stone occur, of course there is more reason for alarm; although, if local inflammation be not excessive, and the kidney can recover from the entailed dilatation, there is hope. Such circumstances, however, are very grave. Much the same must be said of obstruction by tumours, cellulo-vascular bands, etc. Of the tubercular and cancerous degenerations, no hopeful augury can be given. Whilst the constitutional taint is usually enough to finally destroy the patient, the local disease is sufficiently serious to excite extreme alarm. Perforation of the ureters, with effusion of urine, sloughing and abscess, must be fatal. There is little to encourage us in these affections, although in the slighter inflammations we may reasonably hope for recovery.

Treatment.—No special treatment can be directed. The management for passing renal calculus has been already detailed (p. 262). That for extension of inflammation to the ureters does not particularly differ from that for other local attacks of similar nature. Obstructions must be removed, if possible. Those which result from internal tumour, adhesions, or twisting and thickening of the coats of the canals, can hardly be obviated by any known mode of treatment. The early removal of urethral stricture is essential. General morbid states are to be treated by such means as are commonly applied; their enumeration is unnecessary.

Tuberculous and cancerous degeneration, nearly hopeless conditions, can only be constitutionally treated. From the situation and nature of the parts, we are greatly restricted in our remedial measures.

CHAPTER V.

DISEASES OF THE BLADDER.

THE different effects of vesical disease, both within the bladder, and upon the related organs, together with the nature of the morbid processes, will be the objects of our research under this head. To this end, medical and surgical exploration are alike demanded. The various causes—both of disordered function and of actual lesion, will be considered—whilst a large share of attention will be bestowed upon *post-mortem* appearances, and the deductions thence obtained. The prognosis and treatment of the individual affections will follow.

Diseases by displacement will be examined—because, although not, *per se*, properly maladies, they occasion such, and are highly important. Only limited allusion will be made to deformities, arrest of development or wounds. Foreign bodies, with the exception of calculus, will not require a very extended notice.

Anatomical Considerations.—A few points relative to the structure, surgical regions, and relations of the viscus, should be here noticed.

The bladder, ovoidal in shape, and longest from above downwards, lies in front of the rectum and directly behind the pubic bones. Four divisions of the organ are recognized, viz., the *body*, *fundus*, *base*, and *neck*. The first comprises its middle portion, the fundus is the upper, the base the lower part resting on the rectum. These portions have each their separate importance; as the *neck* in strictured, spasmodic, or paralyzed conditions—the *base* in affections involving the rectum—and all, in reference to calculus.

Various *ligaments* hold the bladder in position. The “*true*” are the *anterior*, springing from the inner surface of the pubic arch, and attaching to the front of the organ; the *lateral*, at the sides—both these sets being formed from the pelvic fascia; the *umbilical*, being the remnants of the foetal umbilical arteries; the *urachus*, acting as a ligament, goes from the umbilicus to the vesical apex. Four “*false*”

ligaments are enumerated, being essentially folds of the peritoneum—two *lateral* and two *posterior*—the former correspond “with the passage of the vasa deferentia from the sides of the bladder to the internal abdominal rings,” and the two posterior go to the fundus of the organ, in a course parallel with that of the umbilical arteries.

Coats.—Three in number; *external* or *serous*; *middle* or *muscular*; *internal* or *mucous*. The first only partially covers the organ; and is derived from the peritoneum which clothes the posterior and lateral portions, leaving the upper and anterior free. The muscular tunic has two sets of fibres; first, the longitudinal (*detrusores urinæ*), outside; secondly, fibres going, irregularly, in oblique, and in directly transverse directions. There is a communication between the lateral fibres and the muscle about the prostatic portion of the urethra. The office of *sphincter vesicæ* is performed, according to anatomists, by fibres surrounding the vesical termination of the urethra—there being no sphincter proper at the *cervix vesicæ*.¹

The mucous, or lining tunic accurately fits the muscular; is polished and thin in the normal state; greatly thickened, and sometimes, again, dissolved, by disease; is continuous with the lining-membrane of all its immediately related conduits, as the ureters, prostatic and seminal ducts, etc. The extensive communication thus established should be remarked—reaching from the uriniferous ducts to the extremity of the urethra, in the *glans penis*.

Regions.—The *vesical trigon*² is a triangular plane surface at the base of the organ; its colour paler than the rest of the mucous membrane; very sensitive, especially to pressure and irritation by calculi; at its two posterior angles, the ureters open into the vesical cavity. A thin fascia lies between this part and the rectum, and the triangular shape is preserved. The vas deferens and vesicula seminalis, on each side, bound the space, and the recto-vesical fold of the peritoneum is just behind it. Within this area, the puncture of the bladder through the rectum is made.

The *anterior region*, in relation with the urethra and prostate, is highly important in connection with calculus and the operation of lithotomy. The same may be said of it in regard to catheterism.

The *female* bladder has the same coats as the male; is in close

¹ Guthrie, *Anatomy and Diseases of the Neck of the Bladder, &c. &c.*—Lane, *Lancet*, 1842, 3.—Wilson.

² Trigon of Lieutaud.

relation with the uterus, which lies behind it, as is often manifested in the gravid and parturient conditions, or in prolapsed states of the generative organ, involving the urinary. It is broader than that of the male;¹ lying more transversely in the pelvis; it often "bulges more on one side than the other." (Wilson.) Its relations to the *cervix uteri* and to the *vagina* are intimate.² The shortness and slight curve of the urethra, in woman, allow far easier access to the bladder than is obtained in the male. Vesical puncture in the female, is easily done through the vagina.

Cruveilhier declares the bladder to be always *single*—the so-called "double" bladder being only a herniated state.³ Rokitsky says that it is more or less completely double "in biventral monsters." Fabre (*Bibliothèque du Médecin Praticien*, vol. ii. p. 608) refers to a report by Molinetti, also cited by Vidal de Cassis, in which it is stated that five bladders, five kidneys and six ureters were observed by him in a woman. The account seems to be left in doubt; being questioned by Vidal, and the uncertainty not solved by Fabre, who, however, inclines to endorse at least the *veracity* of Molinetti. Fabre also mentions an instance of "double bladder" related by Blasius, and which he considers less open to dispute than the former case.

Pre-peritoneal Cavity of the Bladder.—A short paper, by Prof. Retzius, of Stockholm, is published in the *Edinburgh Medical Journal*, for April, 1858. It is entitled, "Some Remarks on the Proper Design of the Semilunar Lines of Douglas," and its object is to prove that there exists "a pre-peritoneal cavity," in which the bladder can move "by change of its volume, and that this cavity must have its proper walls." This is well shown by means of three illustrations; and the communication is at once interesting and valuable.

The writer says: "The said pre-peritoneal cavity for the lodging of the bladder is filled with a proper, loose areolar, or connective tissue, already attended to by Douglas and several later anatomists, among whom peculiarly Hyrtl. (*Handb. d. Topogr. Anat.*, Bd. I. p. 513. Ed. I.)" He adds: "The preparation is easily made; best in meagre subjects, by opening the *vaginæ recti* and by sparing the

¹ Said by Cruveilhier not to be *primitively* so; he believes the difference of form owing to the pressure of the gravid uterus; and thinks the increased breadth and diminished height have also been exaggerated. (*Anatomic.*)

² The bladder is more firmly attached to the vagina than to the uterine neck. (Cruveilhier.)

³ See page 110, Part I.

linea alba. I need not say that the linea alba forms in this part merely a thin areolar septum, as a part of the said areolar tissue; on the anterior surface only it has the appearance of a linea alba, formed properly by the junction of the aponeuroses of the obliquus externus, and partly only from those of the obliquus internus" (*Loc. cit.*, p. 866.)

In commenting upon the statements of Prof. Retzius, Dr. Struthers said the society were much indebted for them, and that the paper showed descriptive anatomy was not an exhausted science. He added, that the oval space bounded by the curved lines alluded to, "may be admitted to have reference to the bladder; but the question occurs, whether it is, as it were, for lodging the bladder, or for enabling the recti muscles to act more directly as emptiers of the organ when distended. The curved line of Douglas, bounding the oval space above, is so high that it will still be above a very much distended bladder. The curved line should in future be called the semilunar line of Retzius, rather than of Douglas." (*Loc. cit.*, p. 954.)

We shall treat of diseases of the bladder in the following order of enumeration:—

CYSTITIS.

IRRITABILITY OF THE BLADDER.

SPASM OF THE BLADDER.

PARALYSIS OF THE BLADDER.

HYSTERICAL AFFECTIONS OF THE BLADDER.

WOUNDS OF THE BLADDER.

VESICAL FISTULE.

DISEASES BY DISPLACEMENT: (Varieties of Cystocele.)

SUPPRESSION, RETENTION, AND INCONTINENCE OF URINE.

VESICAL CALCULUS.

FOREIGN BODIES IN THE BLADDER.

I. CYSTITIS. (*Acute.—Chronic.*)

A. CHRONIC CYSTITIS.

This is considered first, because, inversely to the common order, the acute form follows upon the chronic. This is, of course, not constant, as many simply acute cases must have been met with by every practitioner. The acute disease, however, is comparatively quite rare.

Morbid Anatomy.—One or more coats of the bladder may be affected at once, by chronic cystitis. Mr. Coulson describes chronic inflammation of the mucous (the proper *cystirrhœa*), and of the muscular coats, separately. Superficial, and deep or phlegmonous cystitis is the distinction of other writers. (Grisolle.) In chronic cystitis, the capacity of the entire organ is most commonly diminished. The mucous membrane, when alone affected, is found somewhat injected, both in streaks and in stellæ. The bloodvessels are noticed to be dilated,¹ while in some parts the blood has been extravasated, and these spots are generally black, the blood having lost its normal colour. (Coulson; Civiale.) This discolouration increases with the advance of the disorder. The veins are sometimes more than ordinarily developed. There is hypertrophy and softening of the mucous coat; its consistence is altered; it tears easily, and is often found "flocculent." Near the extravasated spots, there is frequently abrasion. From the bladder, the inflammation may

Fig. 26.



Hypertrophy of the muscular coat of the bladder. (From Gauss on the Urinary Organs.)

extend upwards into the ureters, thence to the kidney, when pyelitis frequently follows, and such cases are often fatal.²

Consequent upon this state, the muscular coat, in bad cases, be-

¹ Semmering and others termed this state *varicose*. Grisolle uses the same expression.

² Prout. Coulson. Gross.

comes thickened; the mucous lining often ulcerates, and is more or less completely removed. We then have the *vessie à colonnes* of the French writers. The appearance is similar to that of the *columnæ carneæ* of the heart, the hypertrophied muscular fibres beneath the mucous coat standing up in relief. The cellulo-fibrous lamella is also much thickened, and is denser than natural, the mucous membrane, especially at the fundus of the organ, being often thrown into large, heavy ridges. A bluish or purple-red colour marks the prominent folds, particularly around the vesical neck and fundus—sometimes over the whole organ; whilst in the intervals, the membrane is pale, soft, sometimes dotted with ulceration, swollen, and occasionally thrown into pouches, often containing phosphatic calculi, and usually filled with mucus. This latter condition is generally accompanied by dilated and diseased ureters, and the kidney and prostate gland are frequently affected, the volume of the latter being often greatly increased, and even doubled, whilst it is softened and easily lacerated, sometimes suppurating. (Druitt; Rokitansky; Ferrus; Grisolle, *et al.*)

In certain instances of advanced chronic cystitis, the whole mucous surface of the bladder is spotted in a uniform manner. Nearly every shade of colour may be observed; ashen, greenish-gray, livid red, violet, black. In some persons, the spots are very small, and closely set. Civiale relates a case where fine grayish-black granulations studded the vesical mucous membrane; they were of varying thickness and extent. Around the upper and anterior portion of the bladder, they were more separate and distinct, but were confluent, and formed crusts, some of which were as large as a five-franc piece, near the fundus and posterior wall. The patient passed purulent and foetid urine habitually, and died of marasmus. The same author distinguishes these granulations from the vesicles, or phlyctænæ, which often accompany them; these are yellowish, and he has seen this vesical eruption extend into the membranous portion of the urethra. Generally, the vesicles are of a deep-gray colour, the intermediate spaces being of a bluish-black.

In cases of atrophy and paralysis of the bladder, the mucous membrane is often very pale, and the same state has been noticed in chronic vesical catarrh; but is an exceptional condition according to Civiale. He has far more frequently found a pseudo-membranous layer covering the mucous coat, and a concomitance of the diphtheritic state in the mouth, throat, and lungs. In one patient,

whose urethra, also, was affected, the false membrane was seen at the *meatus urinarius*, as well as in the mouth. The case terminated fatally.

The aspect of the bladder, thus affected, is as if it had been macerated. Sometimes floating free in the vesical cavity, the shreds of false membrane may deceive an inexperienced hand while sounding. They have been met with in atrophied, as well as hypertrophied states of the organ,¹ and are similar to such as are developed occasionally in connection with calculus. Primary exudative processes are very rare in the bladder, the secondary are far more common. Thickening, swelling, induration and gangrene of the vesical mucous membrane are referred to; and also the production of pus mingled with sanious fluid. Dr. Gross notices the above condition under a separate head, as also ulceration of the bladder. He adopts the term fibrinous exudation of the bladder and refers to the true diphtheritic inflammation, first described by Dr. Morel-Lavalée as following the use of cantharides; also, to an example related by Dr. Amédée Latour. The appearances observed by these writers have been nearly consonant with those above given. Dr. Gross refers to a case of "membraniform cystitis," where there was found half a pint of lymph firmly attached to the posterior vesical wall, with a small portion of a fasciculated form, hanging of "into the neck of the organ." The colour of the whole deposit was whitish; it was of a "fibrous texture and evidently organized (and this he mentions is very rare), numerous vessels being seen in its interior." He usually found the deposit existing as an amorphous mass, attached to the *fundus vesicæ*. He alludes, as does Civiale, to instances where it has been found in the ureters as well as in the urethra. The latter author believes this rare, and states that in two patients only was the entire mucous surface of the ureters affected. He also refers to the frequency with which renal disorder follows upon this form of vesical disease. Sometimes one kidney alone is affected; occasionally, both. In such instances, the lining-membrane of the ureters is bathed with pus (of which the canals have probably long been full), and when wiped, it looks red and inflamed; occasionally there is ulceration. The fact of frequent and considerable dilatation of the renal calices and pelves is also remarked, and that, too, where no cause of obstruction to the free

¹ Civiale; Rokitsansky.

passage of the urine has been found; at least no stricture nor enlargement of the prostate gland.¹

Whilst columnar bladder is often found in chronic cystitis, generally, the entire vesical walls are uniformly thickened and indurated, and their aspect, on examination, is homogeneous and lardaceous; this appearance, according to Jones and Sieveking, arises from their being infiltrated "with exudation-matter." In the midst of the fetid, ammoniacal urine, mingled as it is with blood, pus, lymph and flocculent detached mucous membrane, "a soft, pulverulent, mealy sediment, consisting of calculous matter bound together by lymphatic exudation, is deposited upon the internal surface of the bladder."² When the affection has lasted a long time, a sudden exacerbation often occurs from the continuance of the unhealthy urine upon the inflamed vesical surface. Lymph is deposited, the mucous membrane breaks down, and suppuration and gangrene frequently follow. When perforation of the bladder occurs, either after abscess or ulceration, or following gangrene, peritonitis is the inevitable consequence, with a fatal result.

When, at last, the muscular coat is affected—which³ may also be the case subsequently to an acute attack of cystitis, or after sub-acute symptoms, perhaps hardly noticed—the elasticity of the bladder is impaired by the thickening and hardening of the muscular coat. The bladder, on dissection, is thickened, and the inner surface thrown into folds, or wrinkles, by the projecting tissue beneath. There may even be thickening to the enormous extent of an inch. (Baillie.) The muscular fibres of the bladder never show an increase of redness correspondent with their frequently very great hypertrophy. In this respect, an exception to the general rule may be remarked. There are often pouches, and these sometimes contain small stones. Abrasion of the mucous membrane not infrequently occurs late in the disease. Mr. Guthrie thought it rare, but Coulson and some others differ from him. Extension of the affection upwards, through the ureters and into the renal cavities, when the mucous membrane is destroyed near the vesical termination of the ureters, is not uncommon. Ulceration is often found in the renal pelvis.

¹ Civiale. (*Op. cit.*)

² Rokitsansky.

³ Coulson.

B. ACUTE CYSTITIS.

Some authors treat of acute inflammation of the vesical membrane as occurring *alone*, without involving the other and also describe the same condition existing isolated in the muscular tunic. That the weight of an attack may fall upon one of these, is indisputable; so, likewise, that they become successively affected, and therefore coexist, is evident. That it is possible to detect, during life, such conditions, may reasonably be doubted; and certainly, in acute cases of cystitis, unless the inflammation has progressed so as to involve nearly every portion of the bladder, the opportunities for *post-mortem* examinations must be very rare. Mr. Coulson (high authority on these subjects) distinctly states that "this affection may be confounded with inflammation of the muscular structure; but in the latter case, there is not the power of voiding urine, and the desire to void it is less frequent, as it is not experienced until a good deal of urine is accumulated in the bladder, and then comes on in violent paroxysms. Neither is there the burning sensation along the urethra which is felt when the mucous membrane is affected." He remarks, however, that when the inflammation of the mucous coat reaches a high degree, the muscular tissue is also attacked, "presenting here and there gangrenous spots, or even being completely destroyed:" adding, "but as the muscular coat is connected but loosely to the inner membrane of the bladder, the inflammation does not pass easily from one to the other." Gross states, on the contrary, that the inflammation often passes from the mucous membrane to the submucous cellular tissue, and thence to the muscular coat. We should suppose that, in such attacks at least, there would be little difficulty in its effecting cure. Dr. Prout declares that he is "not sure if he is acquainted with any disease of an idiopathic character deserving the name—acute inflammation of the mucous membrane of the bladder." With reference, also, to the limitation of acute inflammation to the muscular coat, he says: "I am quite unacquainted with, and doubt the existence of, the commencement in, and particular limitation of ordinary inflammation to, the muscular structure of this organ." (*Stomach and Renal Diseases*, pp. 367 and 368) He believes, as do most other observers, that in gouty inflammation of the bladder, the mucous membrane is only "secondarily affected."

Etiology.—In addition to most of the causes enumerated as productive of cystirrhœa, acute cystitis may spring from violence done to the hypogastric or perinæal regions; from gonorrhœa, especially when mismanaged; blisters; catheterism; injuries during labour; and voluntary retention of urine.

Morbid Anatomy.—The mucous membrane is found deeply injected, opaque, red, and covered with patches of fibrinous exudation or with pus. The degree of vascular injection varies extremely. The colour may be pink, "light rose" (Gross), or dark purple. The greatest amount of alteration is usually observed about the neck and fundus, and rarely does the inflammation occupy the entire surface in the latter situations. The colour of the mucous membrane, when bare, is often a dark brown. Ulceration, softening, and sometimes gangrene occur. There may be interstitial abscess, and this may open either externally or internally. Nearly utter destruction of the vesical lining-membrane is occasionally found, the muscular coat being almost denuded. Sometimes little affected, the latter may be very red, softened, and even gangrenous. Jones and Sieveking believe this to be the result of phagedænic ulceration. An ecchymotic state, from effusion of blood into the submucous cellular tissue, is remarked; also "the arborescent or capilliform arrangement" of the bloodvessels, according to the intensity of the action.¹ Lymph is rather rare as a morbid product, and is chiefly referrible to the improper use of cantharides, or to irritation from a stone. Engorgement of the veins about the vesical neck and fundus is remarked by many. Very frequently, when seen at the height of the disease, the mucous membrane, if not fairly ulcerated, is *dry*, from the suppression of its secretion; the converse of what obtains in cystirrhœa. The mucus, at first somewhat increased, soon diminishes, and at last fails utterly—thus accounting for the above condition of the membrane. Later, the secretion is re-established, and becomes unhealthy, gradually merging into pus, and is mingled with blood in severe cases. Dr. Gross believes the bleeding to occur often by simple exhalation, although sometimes the capillaries may be ruptured.

All the tunics of the bladder may be found involved in the inflammatory action and its results; and very often these extend along the ureters to the kidneys. The latter are often so much

¹ Gross, p. 178. (*Op. cit.*)

disordered that the secretion of urine is suspended or most materially modified. The lining-membrane of the ureters is also found swollen and red, with lymph, inspissated mucus, or pus obstructing the canals. The prostate gland is swollen, often in a suppurating state, and may thus considerably augment the vesical and other difficulties.

Ulceration may progress from the fundus towards the neck, and conversely. (Baillie; Coulson.) The latter writer speaks of ulcerations strongly resembling "primary syphilitic sores by their excavated surfaces and raised edges."

C. GENERAL CYSTITIS.

Lesions.—The consequences of a general invasion of the vesical textures by inflammation are, a combination of most of the described appearances, together with infiltration of the cellular tissue with serum and lymph; gangrenous tendency of the parts; serous effusion over the pelvic peritoneum. If the disease has been protracted, the peritoneum over the rectum and bladder is dark-coloured, and covered with lymph. General peritonitic indications ensue. The latter are evidently not *primary*, but result from the inflammation and sloughing of the cellular membrane.¹

D. PERICYSTITIS.

Inflammation of the Peritoneal Coat.—Coulson devotes a chapter to the inflammation which particularly attacks the vesical peritoneal investment, and which nearly always involves the cellular tissue around. Rokitsansky designates the latter by the term *pericystitis*. This may arise spontaneously, either "as a primary or secondary process." It is more frequently the latter, and the last-mentioned author styles it a "localization of pyæmia." The affection is prone to spread to the adjacent textures; thus, it goes into the cellular tissue around the rectum, and may extend to the anus and into the scrotum. When, by propagation, it attacks the vesical coats, there may be perforation, with exfoliation of the mucous membrane, as a result. A chronic form is recognized. A state of induration, inflexibility, and "callosity" of the bladder may be induced.

Cases are cited where the peritoneal coat of the bladder has been

¹ Sir B. Brodie's Lectures on the Urinary Organs.

fund alone inflamed. Generally, inflammation of this tunic is followed by fatal general peritonitis. Adhesions to neighbouring organs, observed *post-mortem*, justify the belief that slighter and partial inflammations of the outer vesical coat occur and terminate favourably. Frequently, the peritoneal coat is inflamed in conjunction with the others; when it is so *alone*, there is rarely suppuration, but lymph is thrown out quite freely. Dr. Baillie suggested that extension of the inflammation from the outer coat might be sometimes prevented by "the quantity of cellular tissue interposed between the serous and muscular tunics, and the laxity of their connection."

The chief *pathological changes* are discolouration of, and slight effusion of lymph upon, the peritoneal surface of the bladder, and occasionally of the rectum; the areolar tissue between these organs is filled with serous fluid, and there may be sloughing of the tissue itself. When, as sometimes happens, the affection is chronic, abscesses may form around the bladder, without that viscus being implicated. Such cases are generally extremely difficult of diagnosis, and very frequently fatal.

Mr. Coulson mentions the occurrence of what he terms "pseudo-abscess"—the purulent collection being "really seated within the cavity of the peritoneum, within the pouch of that membrane lying between part of the posterior wall of the bladder and the rectum." The explanation he gives of this is, that partial peritonitis has caused agglutination of certain folds of intestine with the fundus of the bladder; the pus is then "poured into the closed sac, of which these parts, thus connected, form the roof, and the peritoneal pouch the lateral walls." Absorption of the pus may occur in such cases, and adhesions alone subsequently tell the story. But when, as is very commonly the case, the pus is effused into the cavity of the peritoneum, general and fatal inflammation of that membrane follows.

NATURE OF CYSTITIS.

When acute from the commencement, the disease is similar in its action and results to other analogous processes. It has, like them, its different degrees, terminations and constitutional reactions. That it terminates by resolution, not infrequently, cannot be doubted. The occurrence of suppuration is not rare. Chopar^d recorded

many cases, and frequent evidence is afforded us of the fact. The rarity of *idiopathic* acute cystitis is universally acknowledged. Reasoning analogically, we have occasion for surprise at this. Certainly, various causes, which, acting upon other organs, would be almost sure to light up acute inflammatory symptoms, fail to do so in the bladder; a merciful provision, indeed, when we consider the constant occupation of that receptacle by urine of such very varied composition, and often holding in suspension, or solution, matters of a highly irritant nature. The endurance of the stomach, under similar trials, is somewhat parallel. It rarely, unless when very long and pertinaciously abused, rebels, even against considerable departures from proper dietary management.

With reference to the infrequency of acute cystitis, Dr. Gross remarks, that during 25 years he had seen in practice but comparatively few cases, nor had he, in numerous dissections, found the evidences of its previous existence. He cites Louis's observations of the vesical mucous membrane in 500 cases of various diseases, with the result of discovering no serious lesion. Slight vascular injection, with accompanying redness, was observed in six instances without structural change; in a very few, was softening or other organic alteration noticed. The rarity of the affection is confirmed by the testimony of Prout, Hope, Brodie, Bégin, Coulson, Rokitsky, Jones and Sieveking.

General Inflammation of the Bladder.—In that form of cystitis which ultimately implicates all the tissues, in whichever it commences, the *cellular substratum*, according to Dr. Prout, is especially attacked. The pathological changes induced by this form have already been mentioned (p. 294). The primary symptoms will of course differ, according to the starting-point of the disease. Thus, we may have cystirrhoea at first, indicating invasion of the mucous coat. Rheumatic or gouty symptoms are apt to follow an attack made originally upon the muscular coat, or if the nervous tissues be involved. Again, if there be peritonitic inflammation restricted to the outer vesical covering, every indication will point to such local affection. So with the neighbouring organs—the initial symptoms, referrible to the bladder, seem to take their tone, very clearly, from the nature and physiological relations of the part first attacked. At a later stage, however, all special indications become merged in the general condition, the whole system sympathizing. Many authors refer to affections closely simulating cystitis, and

following operations for hæmorrhoids, or others about the rectum. Dr. Prout believes these occur chiefly in persons liable to derangement of the saccharine assimilation, and in those subject to "diffuse inflammation of the cellular tissue."¹ All surgical operations in such persons, and all wounds, for a like reason, are very dangerous.

In general cystitis—all the coats of the bladder and many neighbouring tissues being involved—we are, of course, liable to have an assemblage of symptoms, as well as most of the anatomical lesions, noticed when the separate textures and the surrounding cellular tissue are attacked.

Cystirrhœa, like acute cystitis, is rarely idiopathic. It is regarded in two different aspects, some ascribing to it an inflammatory nature throughout, others regarding it as of a more passive character—a true catarrh, analogous to bronchorrhœa, but independent of any, even subacute inflammation.

The former opinion, reasoning from many of the causes, and judging by the symptoms, seems the best founded. Pain, local heat, uneasiness and fever, precede and accompany most of the cases. This is uniformly noticed in the idiopathic variety. The gradually increasing discharge of mucus has naturally given rise to the term *vesical catarrh*; still, in nearly all cases, inflammatory symptoms, often only subacute, indeed, but occasionally assuming the form of true acute manifestations, are observed. These exacerbations in the course of *cystirrhœa* furnish some of the purest types of acute cystitis.²

Grisolle very decidedly separates vesical catarrh from mucous cystitis, instancing the difference between the morbid appearances in the two *distinct* affections, as he considers them. From his description of catarrh of the bladder, we may gather that at least subacute inflammation exists, and therefore there seems no special reason for separately describing *mucous cystitis* and *vesical catarrh*. May not many cases, such as would be ranked by him under the latter title, be mild ones of the former?

He refers to the fact that vesical catarrh (as he understands it) is a malady particularly attaching to old age, and admits that it is excited by most of the causes which give rise to chronic cystitis;

¹ Personal observation enables us to testify to the fact of simulation of cystitis after removal of hæmorrhoids; in one case, some years since, there was no disturbance of the general health such as Dr. Prout suggests.

² Prout.

also, that those who have had several attacks of the latter, are liable to catarrh of the bladder. We confess to seeing here a "distinction without a difference," except it be, frequently, *in degree*, and owing to modifications impressed upon the attack by age or peculiar circumstances. The slighter differences in the necroscopic appearances may not unjustly be ascribed to some such analogous cause, or to the fact that the inflammatory action is a low one—subacute—and possibly itself, comparatively evanescent, whilst its *effects* remain. Grisolle, however, ascribes the condition to perversion of function, without change of tissue.¹ He also remarks that it is rare when unconnected with acute or chronic cystitis, although it often follows those affections.

Cystirrhœa is generally regarded as analogous to gleet, leucorrhœa and such diseased states. The degree to which these proceed without, or under treatment, will, of course, supply us with cases of different intensity. Both symptoms and lesions will vary according to the age, constitution and habits of the patient, and the management of the case. Oftentimes the catarrhal discharge is symptomatic of other trouble, perhaps of serious lesion. That occasional hyper-secretion of mucus from the bladder may occur without special lesion, marked congestion, or irritation of the mucous coat, is doubtless true, but the comparative infrequency of this hardly places it in a category by itself.

Dr. Gross adds his testimony to that of most others as to the greater frequency of catarrh of the bladder in old persons. He says: "I have never met with it before puberty, except as an attendant upon stone, and but very rarely under any circumstances, before the 45th or 50th year." Dr. Prout considered it most frequent in gouty constitutions. This has not been Dr. Gross's experience, though he acknowledges the undoubted influence the gouty diathesis may have upon the affection when developed.

Cold weather is more fruitful in cases of vesical catarrh than warm, and males are more liable to attacks than females—for the obvious reason that in them the flow of urine is more apt to be obstructed, and they are more exposed. It is said to be sometimes epidemic;² is usually insidious in its approach, and serious disorder may exist before the patient is aware of it.

¹ But long perverted function will finally induce structural lesion.

² Gunther and Chopart, cited by Gross.

With regard to the nature of the inflammation which is said to attack the muscular coat solely, whilst it must be an infrequent occurrence, we can hardly imagine that a genuine phlogosis would remain long restricted to that or any other tissue. It is undoubtedly true that in certain constitutions there are manifestations not noticed in others.

Inflammations in other organs are modified by the peculiar diathesis of the individual, be it scrofulous, tuberculous, cancerous, gouty, or rheumatic. For all practical purposes, the attempt to map out the particular localities of cystitis, is, after all, rather a loss of time. If inflammation be diagnosticated *amongst* the urinary organs, we can generally tell whether it is in the kidneys, ureters, bladder, or urethra, and take our measures accordingly. Of course, if any peculiar diathesis be manifest, constitutional treatment must be directed to it, in conjunction with local measures. Dr. Gross remarks, in this connection, "one thing is certain, viz., that in no case of severe cystitis can any one of the coats of the bladder be seriously affected for any length of time without the others becoming involved." (*Op. cit.*, p. 177.)

An etiological element worthy of special notice is the agency of sedentary pursuits in inducing vesical catarrh. This is universally recognized. Shoemakers, tailors, and those whose trades keep them almost constantly in a sitting posture, are very liable to the disease. Literary men and close students are even more so, although not always sedentary *so long at one time* as tradesmen. Chopart accounts for the great predisposition to, and frequency of, vesical catarrh in men of letters, by their mental preoccupation being often so great that they pay no attention to the calls of nature in respect to urination; thus the urine remains a long while in the bladder, and irritates it, by its qualities and amount. The species of paralysis, thus not infrequently induced, is at least a remote cause of the affection.

Catarrh of the bladder is peculiarly important on account of the frequent consecutive inflammation of the ureters and kidneys. Another serious occurrence is its extension to the seminal ducts. (Rokitansky.) Civiale mentions an instance of change of shape and consistence in the *caput gallinaginis*,¹ and a morbid state of the right *vesicula seminalis*.

¹ "Crête urétrale arrondie et plus dure qu'à l'ordinaire." (*Op. cit.*, tome iii. p. 398.)

It may here be remarked that the mucus voided in vesical catarrh, has sometimes been mistaken for *semen*. Vauquelin and others long since exploded this error. Coulson alludes to it. Suppuration has also been wrongly asserted to be present, when only mucus was secreted—its colour being nearly that of pus. (Ferrus.) In females, whilst the disease is far more rare than in males, it offers certain peculiarities. It is referrible to many of the causes already enumerated, and is often very obstinate. One reason, says Civiale, which has tended to increase the belief in its infrequency in women, is, that they often conceal the fact of vesical disorder, until forced to reveal it. The anatomical arrangement of the parts, also, does not so strongly predispose to it. In females, it has been observed at all ages, and in every grade of social position. A neuralgic condition of the urethra and an atonic state of the bladder are often powerfully inducing causes. Difficult menstruation, or the first irruption of the flow, seems causative. The ingestion of very little liquid and the habit of retaining the urine a very long time, are often rightly accused. Abuse of coitus, and sometimes the state of gestation, contribute to bring on the affection. Very difficult labour has been followed by serious, and even fatal, vesical catarrh. The period of the cessation of the menstrua is one liable to very severe and exceedingly obstinate attacks of the disease, and which are often obscured by uterine symptoms,¹ the vesical disorder being slightly marked, and the great local and general disturbance being naturally soonest referred to the uterus. Besides the points mentioned, there is no appreciable difference in the course and nature of the affection as observed in the female.

In children, vesical catarrh is said not to be rare. The comparative inactivity of the bladder in infants is assigned as one of the causes; giving rise to stagnation of the urine and to irritation consequent upon it. Scrofulous and rachitic children afforded Civiale the most frequent examples. The *inertia* of the bladder, alluded to, with, or without incontinence of urine, was observed. The disease approaches insidiously, and its course is generally slow. Many years may elapse before purulent urine is remarked, but at that epoch the child generally fails rapidly.

Worms, it is well known, are often causative of, and very certainly contribute to prolong, vesical catarrh. Marasmus follows in

¹ Civiale.

many instances, although children often recover from a desperate condition.

In all cases, whether in adults or children, the inflammation, it must be remembered, varies in extent as well as severity. This is important as respects diagnosis, prognosis, and treatment. The complete invasion of all the vesical tunics¹ of course involves the united conditions above stated.

Hectic symptoms sometimes supervene and give an unfortunate aspect to the malady. Impotence may follow, as might be inferred from certain of the lesions enumerated.

PROGNOSIS.

Cystirrhœa, when far advanced, is usually irremediable; especially if the patient be an old man, or of feeble constitution. Slight cases, particularly if the inflammation be circumscribed, are not difficult of cure, if seen early.

Time is an important element in prognosis. Long-continued attacks, besides the local mischief done, gradually undermine the strength, and destroy life by the steady drain maintained. The addition of disease of the nearly related organs, as the ureters, kidneys, prostate gland, or urethra, is exceedingly unpromising.

Besides the debilitating action upon the whole system, the local pain and uneasiness contribute to an untoward result—whilst the depressing influence of the disorder upon the mind, and the recoil of this upon the body, are of the worst augury and influence.

When the neck of the bladder, or the portion around the entrance of the ureters, is implicated, there is far more to be feared than if they remain free; of course, the danger is proportionately increased, if the entire organ be affected.

Acute cystitis is usually rapid in its course. When only slight symptoms arise, the constitution being unimpaired, and prompt treatment adopted, resolution of the inflammation may reasonably be expected. Severe cases, especially if the earlier manifestations be disregarded, are likely to prove very serious. A broken-down system, particularly from intemperance and debauchery, will offer little resistance; and, from impaired vital force, gangrene, even, may be feared. Such a complication is fatal. "Cystitis from pro-

¹ General Cystitis (English authors); Cystitie (Sauvages); Cystiphlogie (Meyzerey); Cystite Profonde ou Générale (French writers).

tracted over-distension of the bladder usually proves fatal from the fourth to the sixth day, being preceded by coma, urinous smell of the perspiration, and suppression of the renal secretion."¹

The association of the disease with affections of the other urinary organs is, as remarked of cystirrhœa, exceedingly unfavourable. If acute cystitis follow a lacerated wound, the danger is far greater than when a clean incision is the proximate cause. Dr. Gross adds to this, that traumatic cystitis is more serious than idiopathic, and the latter more so in men than in women; more, also, at the extremes of life than in middle age.

Sometimes rupture of the bladder happens, without gangrene, from extreme distension of the organ; its coats having become thin through the action of disease, and readily yielding to the pressure of the urine. The accident is, of course, mortal. Ferrus mentions¹ that the rent is generally found in the upper wall of the bladder, the portion least supported by the neighbouring parts, and also the thinnest, naturally. Civiale pronounces the cystitis which accompanies calculus to be a very grave affection; and if, at the same time, atrophy and distension of the vesical parietes exist, the condition is nearly always fatal, and contra-indicates both lithotomy and lithotomy.

Comparatively, acute cystitis, when severe, is more immediately serious than cystirrhœa. When general peritonitic symptoms appear, an unfortunate termination is nearly certain, and local peritonitis is a very alarming state. If the orifices of the ureters or that of the urethra² be obliterated by inflammation, the prognosis is wholly unfavourable.

Cases of pericystitis can hardly be otherwise than alarming, unless they are of very slight intensity, which must be infrequent.

TREATMENT.

I. *Cystirrhœa*.—The efficient treatment of vesical catarrh rests peculiarly upon etiological foundations. Remembering that whatever tends to obstruct the passage of urine from the bladder is a fertile source of the complaint, early attention to the state of the associate organs is indispensable.

¹ Dictionnaire de Médecine, en trente volumes. (Cystite.) See also Civiale, *loc. cit.*

² The latter is by far the most common result. (Ferrus, *op. cit.*)

Stricture of the urethra must be overcome, and, if there be disease of the prostate, every measure suitable to such an emergency must be adopted without delay. Should these conditions be tampered with, it is altogether likely that the consecutive vesical disease will prove obstinate, and very frequently incurable. The same vigilance should be put in requisition with regard to the condition of the rectum; and if there be vesical calculus, its removal, so soon as it can be safely done, is demanded. This latter step, however, must be judiciously taken. No good surgeon will operate for stone by crushing or cutting operations, until any existing inflammation be somewhat subdued, and if possible, wholly quieted.

If inflammatory action be high, and attended with much pain and fever, or if there be pain and frequent micturition without very marked constitutional implication, the abstraction of blood is called for. We have good authority for full bleeding from the arm in these cases, at the onset of the attack. "Fifteen or twenty ounces of blood from the arm will often do more good in breaking up the disease than any other remedies we possess."¹ There are many cases, however, where local depletion is more advisable, and, at the commencement, a large number of leeches (from twenty to thirty), may be applied to the perinæum and inside of the thighs, or upon the hypogastric region. We have found great relief to follow this means, and think the vicinity of the groin or the thighs more suited for the application than the perinæum—at least the effect seems to justify the opinion; and the management of the leeches in the former situations is far easier. The reckless and indiscreet use of bleeding, however, cannot be too strongly reprehended. It can only as it seems to us, be really useful at the very beginning of the disease, and not then in every case, by a sort of routine treatment.² Acute cystitis is far more frequently cut short by it; and to continue it a moment in the catarrhal affection, would be only to aggravate it and induce a true chronic condition.³ The great point to be attained in the management of vesical catarrh is to relieve the bladder from long retention of the urine, and to diminish the necessity of micturition as much as possible. Antiphlogistic measures may often be necessitated by recurrences of acute inflammation during the course of vesical catarrh.

¹ Gross.

² Mr. Coulson considers general bleeding to be rarely required.

³ Civiale.

Fomentations are always useful in these cases. After leeching, the flow of blood is thus conveniently encouraged, at the judgment of the practitioner. A warm bath is also sometimes advisable, though not immediately after bleeding. The great object of warm baths is to keep the patient long enough immersed, and to uniformly maintain the right temperature. Civiale directs from 26° to 28° Reaumur (90° to 95° Fahrenheit) and remarks that he has not observed any peculiar advantage in mucilaginous, over simple warm water baths.

Action of the bowels is to be procured by mild but efficient means; whatever strongly irritates their coats, and especially that of the rectum, must be avoided. Warm enemata, saline medicines, and, if the secretions be much vitiated, calomel and jalap, are to be employed.¹ Whenever full enemata of warm water prove sufficient, they are certainly the best means.

During the first stage, and whilst any activity of the inflammatory symptoms is noticed, the most entire rest of mind and body possible to be secured, should be sought. None but the blandest food and the most soothing drinks should be allowed. Flaxseed tea, that of the slippery elm, mucilage, or water, are nearly equally good. We believe that the first is the best, and have directed its free use with evident great advantage. Much may be expected by the early adoption of these means, and often a perseveringly maintained quietude (preferably in bed, but not on a feather bed) has effected wonders.

Catheterism.—It being a main point in treatment to keep the bladder as free as possible from urine, thus avoiding not only a constant source of irritation, but also pain, and the annoyance of frequent desire to micturate, artificial interference is often imperatively demanded, and not only during the existence of retention. When the latter occurs, the instrument must be used twice or thrice daily, at the very least.² At no time should the operation be more carefully done, the state of the bladder being considered. Civiale reminds us that the urine should be drawn off very slowly, so that the bladder may not retract suddenly upon itself; and his minute directions, as to the insertion and withdrawal of the catheter, are both judicious and necessary:—"Vers la fin, surtout, au moment où les parois de l'organe pourraient venir s'appliquer sur le bout

¹ Gross.

² Coulson, et al.

de l'instrument, il faut retirer celui-ci avant que les dernières gouttes se soient échappées, et son retrait n'exige pas moins de soins que son introduction." (*Maladies des Organes Génito-Urinaires*, tome iii. p. 475.)

Remedies Internally Administered. 1. *Narcotics*.—When pain is severe, there is nothing like opium, in conjunction with the external means already mentioned, to quiet the patient. Frequently, opiate enemata or suppositories will be better than to give the drug by the mouth. Two grains of opium, five of camphor, two of extract of belladonna, and five of soap, form an excellent suppository. (Gross.) Any tendency to constipation must, however, be obviated by gentle means; often enemata will succeed. Long-continued use of narcotics would also tend to weaken the action of the bladder. In mild cases, Dr. Prout thinks well of henbane, conium, lettuce, or combinations of them, and also of paregoric. Civiale has not much faith in hyoscyamus, hemlock, belladonna or camphor; they are not, however, open to the above objections. Barthez has recorded a case in which fifteen pounds of mucus were discharged in thirty-six hours, and in which complete recovery took place after free exhibition of opium by enema.

2. *Terebinthinate and Balsamic Preparations*.—Formerly, the greatest faith was placed in these. Civiale, referring to the then excessive use of such articles, ascribes much of it to their frequent employment by Dupuytren, who, however, was by no means restricted to them. Venice turpentine, in pilular form, was a favourite remedy with this celebrated surgeon; but, as some of his cases, prepared by certain of his own pupils, and quoted by Civiale, show, he used the turpentine empirically, and in every variety of case. The results were far from satisfactory in most instances, and certainly do not justify the sounding title of "*l'âme des organes génito-urinaires*."

But this remedy, like most others, is not to be rejected because sometimes abused. In certain cases, the resins may be advantageously employed. Thus, when there is only exalted sensibility of the vesical neck, owing to, or connected with obstinate costiveness, turpentine may do good by its purgative and revulsive action. (Civiale.) The improvement is, however, apt to be only temporary, and the latter writer has remarked the same with respect to balsam of copaiva. This was a favourite remedy with Sir A. Cooper, who gave it in doses of eight or ten drops, three times a day, with sweet spi-

rits of nitre and camphor. There are many other objections to the use of resinous medicines. The stomach, not infrequently, rebels against them. Nausea and vomiting, colic, and even diarrhoea difficult to arrest, may supervene.

There are no remedies, probably, so distasteful to most persons, and this is also especially true of copaiva. Coulson, Ferrus, Civiale, and others, remark the tendency in these substances to excite overaction, and induce catarrhal states of the bladder, and even momentary retention of urine, and make this an objection to their employment. By homœopathic dogmas, patients thus affected would probably be kept continuously upon a course of turpentine.

Mr. Coulson directs great caution to be observed in the use of both copaiva and cubeba. The former he prescribes in combination with small doses of zinc, Chian turpentine, or sulphate of iron. He has found much relief follow the administration of the compound tincture of benzoin. Benzoic acid is also highly commended by Dr. Gross, who says "it occasionally acts like a charm;" and succeeds when all other remedies have failed. He "has rarely been disappointed" in his expectations relatively to *copaiva* in vesical catarrh, and directs it to be given in ten, fifteen, or twenty drop doses, three or four times in the twenty-four hours, in emulsion of gum Arabic and loaf sugar. In alluding to its occasionally nauseating and griping effects, he advises laudanum or morphia in conjunction. To obviate pyrosis, and analogous states of the stomach, bicarbonate of soda may be added.

Of the turpentines, the Chian finds most favour. The pilular form is best, the substance being made up with extract of henbane, cicuta, or colchicum.

3. *Other Remedies.*—When the urine is very alkaline, and mucus is excreted in great quantity—with phosphatic deposits—the *alchemilla arvensis* is strongly recommended. The infusion is the usual form for administration, an ounce of the dried plant to a pint of boiling water, and steeped three or four hours. The dose is two ounces three times a day. (Coulson.) Buchu, uva ursi, and pareira brava are all serviceable in certain cases, and should have a trial. The uva ursi, however, is seemingly the most available of the three. Buchu may be advantageously combined with it, and carbonate of

¹ Five to fifteen grains, three or four times a day, is the dose, by itself, or with balsam of copaiva, in mucilage of gum Arabic. A few drops of Haarlem oil are sometimes advantageously combined with it.

soda or potash, also, especially in cases where the vesical neck is morbidly sensitive. (Gross.) The infusion is best, as of buchu, and one or two ounces should be given three or four times in twenty-four hours. The pareira is often offensive to the stomach, and in Dr. Gross's hands has never seemed to have "any special influence upon the urinary apparatus." He prefers, when using it, the aqueous extract, and combines it with opium, morphia, or lupuline. Five to fifteen grains every eight hours, is a proper dose. Dr. Prout speaks highly of the *pareira brava*, and places after it, in efficiency, the *ura ursi*, and the *lythrum salicaria*. Their power seems confined to the intermediate stages of the affection. Civiale has nothing favourable to say of *pareira brava*. Strong testimony in favour of the trailing arbutus (*epigæa repens*) is borne by Dr. Ives, of New Haven, Conn.,¹ also by Dr. Knight, of the same place, and by Dr. Gross, who cites their reports. Mild diuretic and astringent qualities belong to this plant, and it acts much like *uva ursi* and buchu.

As is frequently remarked of purgatives, that several different articles act more quickly, efficiently, and easily in combination, such is the fact with the medicines just enumerated. Buchu, *uva ursi*, and cubebs (infusion or tincture), with a little carbonate of soda, and now and then "a few drops of balsam of copaiva," muriated tincture of iron, or dilute nitric acid, act very pleasantly and effectually together.²

The increased good effect from combining several of the remedies used in chronic catarrh of the bladder, is remarked by Dr. Prout. He speaks of "the infusion of *diosma* with Chian turpentine, cubebs, or even copaiva," as advisable.

4. *Tonics*.—These are not infrequently required, especially in advanced stages. Failing appetite, colour, and strength, may often be effectually restored by the use of iron. The tincture of the muriate is a favourite remedy, in the dose of ten to twenty drops *ter in die*, and is believed directly to influence the urinary organs. The ammoniated tincture is sometimes used with advantage.

If the patient manifests gouty or rheumatic tendencies—the class of cases when, if ever, the muscular coat of the bladder is solely, or more likely, *first*, affected—the employment of *colchicum* is necessary. One, or one and a half drachms of the vinous tincture, with fifty drops of laudanum, or one-half a grain of morphia, every night,

¹ Trans. Amer. Med. Assoc., vol. iii. p. 314.

² Gross.

to be followed by a saline draught in the morning, is advised by Dr. Gross. The acetous extract is occasionally valuable as a substitute.¹

5. *Remedies indicated by the state of the Urine.*—Certain medicines are indicated, according to the condition or changes in the urine. A chemical examination is always important.

If the urine be acid, as usual in the earlier stages, carbonate of soda, eight, twelve, or more grains at once, is good. Alkaline states demand the mineral acids. The nitric, muriatic, and sulphuric, in small doses, are often serviceable; the effect is twofold, corrective and tonic. Dr. Gross speaks highly of weak lye. He pours half a gallon of boiling water upon a pint of hickory ashes, shakes the decoction often, and decants the liquid in twenty-four hours. The dose is a wineglassful, frequently. He has found this useful, when other alkalies have failed.

6. *Revulsive and Mechanical Measures.*—In many cases, counter irritation is exceedingly useful. The seton seems the most convenient, and has proved an effectual, means. Antimonial ointment, wherever used, is a painful and troublesome application; and issues certainly merit the latter adjective. The actual cautery, and the moxa, especially in Europe, have been much in vogue. Their application may now be made painless by anæsthetics, but all useful purposes are generally gained by the seton. It is often difficult to say how much the seton has to do with the cure, since other means are always employed. Civiale strongly recommends antimonial ointment, although he mentions nausea, vomiting, and entire covering of the body with the pustulation, as occasional results. From the latter occurrence, he believes powerful revulsive effects may be hoped for. He seems to place no confidence in either the seton or cautery. Roux met with some success with the seton, which he particularly directed to be placed in the hypogastric region. Frictions, with mercurial ointment and stimulating liniments, have been found of little or no avail. If blisters be ever used—and it is a question whether they should be, except very early in the disease, and when irritation about the vesical neck is not urgent—great care must be taken to avoid the accidents they often occasion. Morphia and camphor may be sprinkled over the blistered surface, and the part subsequently poulticed. When rheu-

¹ Prout, *op. cit.*, p. 229.

matic indications exist, blisters are believed to be most demanded. They are placed upon the hypogastrium, sacrum, or inside of the thighs¹—the two latter localities being, as we believe, far preferable; the former is too near the bladder, and instead of being derivative and counter-irritant, might prove directly so. In all the positions named, Civiale has seen troublesome accidents follow vesication, and does not speak in favour of the procedure.

7. *Injections and Irrigation of the Bladder.*—These have long been acknowledged useful means. Civiale, in 1826 and 1829, writing upon lithotripsy and upon the vesical catarrh of old persons, referred to them. In a later work, he recommends the same course in atonic and paralytic conditions of the bladder.

The objects to be attained are, to cleanse the viscus from any deposits left upon its mucous surface after urination, to act locally against any existing inflammation, to excite the impaired muscular contractility, so that complete evacuation of the urine may be naturally effected.

Warm water should be used at first, and the temperature gradually diminished until that of ice is borne; the colder grades being intended for reanimating the diminished tone of the organ, whilst the first injections are directed against the mucus, pus, or gravel remaining on the inner vesical surface. Civiale, Ferrus, and indeed all writers, advise special care in introducing the catheter, and the former particularly directs the preparation of the urethra by the previous introduction of soft bougies for a time. The injections should be made immediately after the urine has passed off by the catheter (the pipe of the syringe being introduced into the orifice of the latter), and thrown very slowly into the bladder, stopping when the organ begins to contract, as shown by the patient's desire to urinate. The process is renewed daily, with the same precautions, and continued until improvement occurs, without interval, unless a marked sensation of fatigue be experienced by the patient at the time, or there be great urethral tenderness, with suffering when the sound or the urine passes. Under such circumstances, an interval of a day or two is advisable, with calmative measures: rest, baths, copious demulcent drinks, and especially soothing *clemata*. Generally, says Civiale, the patient experiences no, or very trifling, inconvenience—and in from three to eight days, he can urinate

¹ Desault, Chopart, Boyer.

much more freely, and there is great diminution of the various posits in the secretion.

When this amount of effect is produced, injections more frequently, or even continuously given ("*coup sur coup*") are made. In lowering the temperature of the water, care must be taken so *gradually*; there might be troublesome reaction, although rarely, this is little to be feared. At all events, rapid diminution of the warmth of the water is inadmissible.

Most patients experience no unpleasant sensations from even cold water in the bladder; to many it is agreeable.

Mr. Guthrie used warm injections and gradually *raised the* temperature. We can conceive of a good result, in many instances by this method. If pain exist, it is likely to be thus sooner diminished than by cold applications. This assertion finds ratification in the fact of somewhat different nature; in severe pain from a sprain of the wrist or ankle, we have met with many examples where warm, gradually raised to the hot, douche, acted like a charm annulling an agony which had only been growing more severe under cold irrigation and douche. Then, again, it is a well-known fact that a part becomes cooler after warm applications and warmer after cold ones. A hint may be taken from these considerations. Civiale, however, in noticing Mr. Guthrie's recommendation, he acknowledges the utility of heat as "a stimulant in certain cases of inactivity of the bladder," remarks that its influence is transient and that a very high temperature—too high for prudence—must be demanded to insure a decided reaction.¹

Compound injections have been advised. Chopart used a solution of water. Calomel, nitrate of silver, and even corrosive sublimate (grain of each) dissolved in four ounces of distilled water, were used by Bretonneau successfully. Trousseau has used corrosive sublimate advantageously, and testifies to the good results obtained by Bretonneau. Lallemand and Serre employed nitrate of silver injections, and such are still used with good effect in certain cases. Great caution is required in their administration. Civiale warns us against allowing a solution of lunar caustic to remain long in a *sacculated* bladder. The catheter should be left in

¹ But if hot water be a "stimulant" at first, it becomes a sedative subsequently, and such action is often needed in cases of the kind under consideration. Cold douche, also, having its uses.

to draw off the liquid, and one or two injections of pure water subsequently made. In cases where the catarrh is limited to the vesical neck, injections would be nearly unavailing, but cauterization by certain other methods, hereafter to be mentioned, might be serviceable.

Tar-water (Dupuytren); balsam of copaiva (Souchier); tincture of opium and extract and tincture of belladonna; decoction of soot (Giboin); decoction of poppy; nitric acid¹ (Coulson. Brodie); and other preparations (alum, zinc, copper, iodine, creasote, cicuta, being the active ingredients) have been thrown into catarrhal bladders, at times, with apparent benefit—at others, ineffectually—and sometimes, doubtless, injuriously. Of iodine, internally used, Civiale speaks in very disparaging terms. For most of the purposes to be attained, injections of pure water are probably best and sufficient.² Whatever is used (of a compound nature), a small quantity only (two or three ounces) should, at first, be thrown into the bladder, and retained but a few minutes, *or as the bladder bears*.

Irrigation often proves serviceable. Dr. Gross refers its origin to Mr. Foot, of London, but without date. Civiale ascribes its introduction to the endeavour, by Hales, to dissolve calculi by chemical means—for which purpose he employed a double catheter (*sonde à double courant*). Cloquet, to whom the invention was wrongly attributed, exhibited to the Academy of Medicine, in 1823, an old man in whom he had cured vesical catarrh by irrigation of the bladder, with the above mentioned instrument. The bladder recovered its powers completely, and there had been no relapse 18 months afterwards. Cloquet stated that he had not always obtained such good results, but there had never been any untoward circumstances arising from the operation in his hands. Civiale's experience is similar; he, however, prefers *cold* water to warm, as used by Cloquet. He believes the contractility of the viscus to be thus sooner aroused—and considers this the great object of the procedure. His success by this method had not, apparently, been remarkable—still he recommends it as sometimes proving more efficacious than injections. (*Op. cit.*, vol. iii. p. 505.)

Dr. Gross, describing this operation, mentions *tepid* water only.

¹ This has succeeded in cases not very advanced—the urine being alkaline.

² Chopart used barley-water first, and then mineral water, as is stated, with good effect—"Eau de Bares," or, if there were atony of the bladder, "Eau de Balaruc."

He uses a syringe containing a pint, with a double, full-eyed catheter, which should be "as large as is consistent with its easy introduction." There should not be more than two irrigations daily—nor should the process be attempted when the urine is bloody, or when there are symptoms of acute cystitis.

8. *Cauterization with the solid Nitrate of Silver.*—This operation has been not infrequently done, and is mentioned by various writers. Dr. Gross, rather hastily, says that Civiale, in conjunction with others, "recommends" the use of the solid nitrate of silver for cauterizing the bladder when affected with catarrh. Now Civiale, it seems to us, is very guarded in his mention of the method—and it is hardly proper to say, broadly, that he *recommends* it—lest no reservations should be understood. The French surgeon's experience in diseases of the genito-urinary apparatus justly gives his opinions great weight, and they should be carefully quoted. He distinctly says that he always restricts himself to rapid and superficial cauterization with the lunar caustic pencil; that he never resorts to it until he has exhausted all other milder means—and then, with previous preparation of the urethra, by the introduction of simple bougies. He reprobates the practice of those who indiscriminately and recklessly apply the caustic to the vesical neck, and who look upon the measure as a sort of *panacea*. It is, moreover, a rule with him to confine this treatment to those cases where the catarrh affects the neck of the bladder, or that portion immediately around it. These are very qualified recommendations.

The instrument used to carry the caustic may suitably be as large as, or even larger than the common sound; it is to be managed as in cauterization of the urethra. Another mode is by covering about an inch of a soft bougie with nitrate of silver—the portion thus armed being about twelve or fifteen lines¹ from the extremity which penetrates the bladder. The rest of the bougie is covered with cerate or lard. The first cauterization should be about thirty seconds in duration; subsequently, two or three minutes may be taken, when the effect and the pain are less sensibly felt. It is often advisable to make the intervals between the cauterizations as long as in cases of severe neuralgia of the vesical neck, or of spermatic difficulties.

¹ 12 lines is about one inch and one-sixth; 15, one inch and seven-eighths, according to the old French measure.

The chief conditions rendering cauterization advisable, are thickening of the mucous membrane of the neck of the bladder, accompanied by exalted sensibility, or a tendency to bleed—the affection being limited to the region of the neck. In such instances, Civiale found improvement to follow the operation. There was diminution of the frequent desire to micturate; bleeding ceased, and the urine became clear. Revulsives, injections, and irrigation have become effectual *after* cauterization, having been, previously, wholly inert. The action of the cautery is purely local; it represses the tumefaction, removes the small tumours sometimes existing about the vesical neck, or at the internal urethral orifice, and diminishes the morbid sensibility. The other adjunct means must be brought into action.¹

Dr. Gross is not impressed with the efficacy of cauterization, after due trial. He uses a common porte-caustique, and makes a rapid introduction and withdrawal. This author alludes, in terms of high praise, to the operation proposed by the late Mr. Guthrie, of London, and successfully executed by Dr. Parker (Professor of Surgery in the College of Physicians and Surgeons at New York). The operation consists in opening the vesical neck, by an incision similar to that made in the lateral operation for lithotomy. The object is to afford a degree of rest to the bladder, by allowing the mucous flow free exit. The wound is to be kept open for a time, guarding against any tendency to fistulous change. In Dr. Parker's patient, there was temporary relief, although the man finally died. *Post-mortem* examination revealed extensive renal disease, hypertrophy of the muscular coat of the bladder, and miliary tubercles on the mucous coat, also tubercles in the kidneys and lungs. The patient being fifty years old, and tuberculous, could have had but little chance for life. Dr. Gross considered the amount of relief experienced (for a time there seemed a fair chance of recovery) as justifying the operation, and that it is particularly suited to those cases where the prostate is enlarged, and the muscular vesical coat hypertrophied. (*Op. cit.*, p. 234.)

Management of Convalescence—General Considerations.—The necessity for strict hygienic and dietetic precautions after convalescence is established, cannot be too strongly insisted upon. Avoidance of

¹ Civiale closes his remarks upon the measure thus: "I cannot share in the enthusiasm of those who make cauterization of the bladder a general mode of treatment in the larger portion of the maladies which affect it." (*Op. cit.*, p. 508.)

cold and dampness; of horseback exercise; of repletion bladder, and of sexual intercourse, is absolutely requisite also very important that a regular stated order of evacuation bladder should be adopted. Change of climate has been and especially to one which is warmer. Dr. Gross has sent to pass their winters in New Orleans, Cuba, and Texas, with advantage. It is not a matter of slight moment to regulate Whilst, during the existence of the affection, or when the recurrence, or an acute attack supervening upon the chronic the lightest and blandest articles of food are alone admissible regimen is not to be suddenly or soon changed. After if the case is more promising, and the improvement follows comes convalescence, a gradual increase in the quantity change in the quality of the food, may be allowed. Some broths. These do very well for many persons; but there are who cannot take them without dyspeptic symptoms. Such we have found do well upon game-birds, such as quails, partridges, etc., in moderate quantity. All condiments are to be avoided salt, we are cautioned not to use too freely, nor vegetable acids acid fruits, wines, nor spirituous and fermented liquors.¹ the precautions used during an attack, should be persevered some time after we hope that recovery is fully established there is great advantage in the continued use of mucilaginous drinks; and we have, moreover, found that restricting patients to cold flaxseed tea, or to gum-water, has, without other means when conjoined with rest of body and mind, and farinaceous food been sufficient to enable them to recover from what, at first likely to prove a grave disease.

The situation in which a patient lives, his dress, habits, and position, of importance. Thus, Ferrus particularly enjoins an elevated position, open to the sun and wind. The wisdom of wearing next the skin, at all seasons, is universally allowed—the temperature of course, being varied. The dampness of evening air should be avoided, if possible.

There is a practice which may advantageously be made by a person labouring under vesical catarrh, viz., to walk to the chamber a few times every morning before urinating. This is thereby mingled with the urine, and thus is more easily

¹ Gross.

completely voided; any deposition of *gravel* is also less likely. The precaution might usefully be adopted, even by healthy persons.¹

When inspissated mucus, or other matter, blocks the internal urethral orifice, and the urinary flow is suddenly suspended, it is better to give a sudden, quick movement to the body—a jerk—which may dislodge the obstacle, than to *strain* powerfully. Those who are constantly sedentary, should, for a time at least, abandon their pursuits.

Severe and protracted cases, especially when there is concomitant renal disease, or such as involves the ureters or the prostate, generally admit of relief only; cure can hardly be expected. Entire quietude, and strict attention to dietetic rules—supporting the gradually failing strength—are of the utmost importance. The frequently severe pain must be subdued by anodynes; we are hardly justified in abstracting blood—even locally—at this stage of the malady, notwithstanding that occasional spontaneous hæmorrhage is temporarily an alleviatory phenomenon. (Gross.)

Mental discouragement we must strive to remove, or it will prove a serious element in hastening the patient's downward progress.

Accidents following or accompanying Treatment.—Orchitis is frequent whilst treating vesical catarrh; it obliges the surgeon to suspend his measures until it is cured. Febrile paroxysms, of intermittent type, sometimes appear, and occasionally a more grave form of fever, indicative of some inappreciable complication, and which requires close watching, with a like suspension of the vesical treatment.²

Disturbance of the renal and vesical functions is common; there may be increase or diminution of urine; the latter, of course, is the graver state. Frequent micturition is often imperatively demanded in the former condition, to the great distress of the patient. There may be incontinence of urine; either simple, or where it is owing to an hypertrophied condition of the vesical walls, with relaxation of the vesical neck. Injections of warm, and then of cold, water, which benefit the simple form, have little or no effect in the latter, which is, therefore, far more serious. (Civiale.)

II. *Acute Cystitis.*—Whether idiopathic, or intercurrent in the

¹ Mentioned by M. Ferrus (*loc. sup. cit.*) with approval. Although he says it is "presque ridicule pour un homme en santé." It was suggested to him by a physician specially devoted to hygiene; "un médecin hygiéniste."

² Civiale.

course of chronic catarrhal disease, the treatment is, for the most part, the same. The removal of any discovered direct cause should follow the palliation of its effects, which is, at first, urgently demanded. We may often obviate the results of repelled cutaneous eruptions, by blistering the spot whence the retrocession took place; adding to this such measures as the circumstances indicate. Return of the eruption may afford great relief, even when insufficient to remedy all the difficulty.

Urethral stricture must be promptly overcome. The presence of foreign bodies, such as bits of bone, splinters, or substances introduced with improper intention into the urethra, and thence slipping into the bladder, is not infrequently followed by acute inflammation, unless immediate measures be taken for their removal. The inflammation occasionally excited around a calculus, and which, if rightly treated, is usually temporary, should be overcome before attempting to remove the concretion. Such cases generally do well, when we finally succeed in extracting the stone.

When the specific action of *cantharides* has caused cystitis with strangury, prompt local and constitutional treatment is necessary. The vesicated surface must be fomented or poulticed; large draughts of mucilaginous liquids should be given, in which sweet spirits of nitre is fitly administered. Anodyne enemata are sometimes necessary, or else narcotics by the mouth. A "popular remedy" has been highly spoken of, viz: decoction of parsley-root and water-melon seeds. Its free use is directed, according as it is borne by the stomach, and either alone, or with the addition of sweet spirits of nitre or paregoric.¹ More heroic treatment is but rarely required. In certain instances, local bleeding, purgation, and warm baths may be called for.

Liquor potassæ, in a large quantity of demulcent liquid and in the dose of thirty drops every hour, has been recommended in the strangury thus arising, by Dr. Mulock of Dublin.²

Acute cystitis by propagation from gonorrhoeal inflammation,³ should be treated by antiphlogistics and attention to the specific affection. Anodyne enemata are here often very serviceable.

General Means.—The patient must be put upon a low diet, and

¹ Dr. Gross, *op. cit.*, p. 190.

² Dublin Quarterly Journal of Medicine. The writer can testify to most satisfactory results from the same remedy in like cases, in smaller doses.

³ A form rarely severe, and confined to the neck of the bladder. (Gross.)

rest enjoined. The inflammatory action, when violent, should be subdued by general bleeding and purging. If demanded, the former should be boldly done, and to some purpose. We must be guided, mainly, by the patient's age, strength, and previous condition. Young, vigorous, and plethoric persons must be correspondingly managed, whilst the old and feeble receive a modified treatment.

As has been pertinently said, "we bleed here, as in other violent inflammatory affections, for effect and not for ounces."¹ When faintness is induced, the vein should be closed, and may be reopened on occasion. One copious bleeding, with a laxative and a dose of Dover's powder, often succeeds in from thirty-six to forty-eight hours, and sometimes sooner. In just such cases, we have seen the very best effects from leeching. Dr. Prout, in acute cystitis of a phlogistic kind, directs general bleeding, and mentions the preference of certain French surgeons for drawing blood from the *foot* instead of the arm. To this he joins local bleeding.

With regard to purgation, it should secure freedom of the bowels; and cooling medicines, aided by cold enemata, are best. If there is biliary disorder, the use of calomel is indicated. This is recommended² in "active doses" with opium, together with clysters. Mr. Coulson does not believe mercury of service except at the very beginning of the attack. Castor oil is by some considered the best purgative. After fæcal collections are removed, regular discharges may be procured by salines and enemata. The latter should not be too large, lest they irritate the inflamed bladder by their pressure.³

Anodynes and diaphoretics are universally recommended. Antimonials with salines are a favourite remedy with some practitioners. Caution is requisite lest the stomach and system should not tolerate the medicine. Dover's powder is peculiarly indicated when the double effect of anodyne and diaphoretic action is needed, as is very frequently the case.⁴

Tepid drinks, and such as are mucilaginous, may be given with great advantage, only that an excessive use of them should not

¹ Gross.—This author does not restrict general bleeding to these urgent cases, but uses the lancet in others, where, although there is much suffering locally, there is little or no constitutional affection.

² Prout.

³ Gross.

⁴ Mr. Coulson, with others, concedes the palm to *opium* in quelling pain and procuring sleep in this affection.

be encouraged, lest constant distension of the bladder annul any advantage they might inherently possess. Most of the drinks should be warm, because it is desirable to induce perspiration, by their aid and that of special diaphoretics.

From the remarks just made, it may be inferred that strong diuretics are inadmissible in acute cystitis. In very acrid states of the urine, nitrate of potash, or sweet spirits of nitre in some bland fluid is useful.¹ Everything stimulating must be discarded.

In the latter stages of this disease, a tea made of *uva ursi* and hops is highly recommended. An ounce of the former and half an ounce of the latter, to the quart of water; dose, a wineglassful five or six times a day. When acidity of the stomach exists, bicarbonate of soda (fifteen or twenty grains) may be added. Pain and spasm at the vesical neck are often allayed by this means, and resolution of the inflammation is aided.²

The infusion of diosma (Ḥij to Oj), copaiva, in small doses, and essential oil of cubebs are recommended by Mr. Coulson, in addition to the infusion of hops and the alkalies.

Local Remedies.—In cases showing any severity, the immediate application of fifteen or twenty leeches to the perinaeum or hypogastric region³ has often an excellent effect. In mild cases, we have derived advantage from a less number, even *four* or *six* have afforded decided relief. Fomentations, immediately after leeching, are available to prolong the flow of blood so long as may be necessary, and are of service as soothing applications.⁴ They may be either simple or medicated. We have found great advantage in thus using laudanum. Camphor, poppies and hops are also useful. Cupping is often very serviceable, and the warm bath should be tried. The cups, either dry or wet, applied over the lumbar region, often relieve the pain and uncomfortable sensations felt at the lower part of the back. Anodynes, locally applied, and revulsives are likewise useful. The common mustard plaster applied above the pubes and to the small of the back; tincture of soap and opium; a wet compress covered by dry cloths, acting finally like a fomentation; and, what has not yet been very generally tried as a local

¹ Gross.

² Ibid.

³ Mr. Coulson says the latter, and we certainly have seen more benefit thus, than when the other region was chosen.

⁴ Have two sets ready (in cold weather, at least), in order to avoid the risk of evaporation and chill of the surface.

remedy for pain, chloroform, applied by means of flannel or spongopiline.¹

Much comfort and actual benefit are derived from anodynes locally used. Enemata of an opiate nature, or suppositories similarly composed, not only allay pain and spasm, but they diminish the desire to micturate, and thus afford repose to the suffering organ. One drachm, or a drachm and a half of laudanum, mixed with two ounces of tepid water, is a proper injection, the bowels having been previously emptied by purgatives. An enema, if sufficient, is preferable. "Care should be taken not to force the fluid against the anterior wall of the rectum." (Gross.) It has been advised to inject oil and opium into the bladder, but Mr. Coulson does not favour the practice, and it seems at least of dubious efficacy.

Suppositories made from powdered opium, with conserve of roses (two to four grains of the former, according to the urgency of symptoms), are the best. Morphia, lactucarium, and hemlock are used, but do not merit the preference. A general warm bath, or the hip-bath, *warm*, is often beneficial. The latter, at all events, should be tried in cases where patients can endure the fatigue. Mr. Coulson thinks it "very serviceable." Assistants can readily place a patient in the general warm bath. A temperature of from 85° to 92° Fahrenheit, and continuance in the water from twenty minutes to one hour, according to the effect produced, and the intensity of the complaint, are advised.

Complications.—Constitutional affections, such as gout or rheumatism, will require attention. Colchicum is often used with benefit in these cases. The acetous extract is recommended, and opium, in some form, will often be needed.

Hepatic disorder, as already hinted, requires mild mercurial measures. Complication of renal, urethral or prostatic disease will demand the special treatment attaching to each case. When the prostate gland is inflamed, there is little difference in the treatment indicated, from what is employed in the vesical malady. Leeching about the perinæum and anus, fomentations, warm hip-baths, etc.; with solutive, and sometimes anodyne enemata, are appropriate measures. If abscess form, a puncture with a lancet should be made as soon as may be; not allowing the abscess to break spon-

¹ Dr. Gross recommends a large blister, the vesicated surface to be subsequently poulticed.

taneously. It is very desirable that the pus should not issue by the urethra or rectum, nor pass behind the bladder. (Coulson.)

Occasionally, calculi in the prostate gland cause difficulty, of themselves, or in conjunction with vesical inflammation. They should be removed, if possible to effect it without much local disturbance and severe measures. Mr. Wilson (*Lectures on the Urinary Organs*) recommends cutting them out when easily felt in the rectum; and also says, very sensibly, that they should be let alone when quiescent. Dr. Prout mentions having seen them frequently removed by Sir B. Brodie with Weiss's forceps, in cases where they could thus be reached. When chronic degeneration of the glandular substance, with enlargement, occurs, there is little chance to effect anything by antiphlogistics or other means. Sedatives are occasionally very useful. A full dose of opium will sometimes cause free diuresis.

Treatment of General Inflammation.—This state is nearly, if not quite hopeless, especially if the subjacent cellular tissue be also attacked. Not much more can be done than to palliate suffering, and in a measure sustain the patient's strength. When the peritoneal coat is alone inflamed, vigorous antiphlogistic measures are demanded—bleeding, leeching, calomel and opium, warm fomentations, etc.; but when the adjacent tissues are also affected, and rigors, with tympanites, hiccough and delirium ensue, these measures will not answer. Stimulants may then be often essential—certainly there is no call for the abstraction of blood. Sometimes, deep-seated abscess forms, when chills alternating with heats, and finally, *hectic* symptoms come on. These cases are often very obscure and exhibit the gravest indications.¹ Rigors, suddenly supervening, would of course cause suspicion of the state of things. The termination is usually fatal, but patients are sometimes benefited by bark and mineral acids, and may need wine. This is especially the case if *hectic* symptoms are observed—when the treatment must be restorative and the diet suited to the same end.

Certain Sequelæ of both Chronic and Acute Cystitis.—1. *Suppuration of the bladder*, with formation of abscess between its coats, may occur singly, and it also follows acute or chronic inflammation of the organ. It is far more frequent after the latter, and the amount

¹ Coulson.

of pus discharged is sometimes enormous, very foetid, and of unhealthy aspect—more particularly in chronic cystitis, being thin and sanious at times. The abscesses formed are, from their situation, necessarily small; never larger than a billiard-ball or an orange, and this size even is very rare. (Gross.) “A pea, filbert, or pigeon’s egg” are the ordinary comparisons.

Besides the idiopathic cases, there are those arising from external violence, from the use of instruments, or from the presence of foreign bodies. The collections of pus found between the vesical coats after lithotomy are believed to arise from phlebitis.

Whilst the diagnosis of these cases is always obscure, the prognosis is not infrequently favourable. The exceptions to this are those protracted instances in which hectic symptoms finally supervene. Very many such arise from external violence. Nor can much be promised those patients in whom abscess is diagnosticated. When situated between the vesical coats, it cannot be clearly announced during life, and prognosis must rest wholly upon the general state of the patient. Abscess combined with calculi, is an unfavourable condition; the purulent collections are apt to recur indefinitely, and the patient is gradually exhausted, or has total suppression of urine. The suppuration which succeeds acute cystitis is not usually considered dangerous, and is generally amenable to judicious management. In the treatment instituted, the causes, nature and stage of the affection should all be regarded. We remove irritating substances, allay pain and spasm by the usual means, and generally best by anodyne injections or suppositories. Opium by the mouth may often be needed. The bowels are to be kept free by mild purgatives. Blue pill, rhubarb, Epsom salts or calcined magnesia are proper. Antiphlogistic measures are called for at the outset, according to circumstances. Later, and especially in the chronic form, when debility begins to be felt, great attention must be given to preserving the strength, and tonics are sure to be required. Hectic symptoms must be met by bark and aromatic sulphuric acid.

2. *Gangrene of the Bladder*.—This condition is observed after originally acute inflammation of the bladder, or after an exacerbation of the chronic affection, which latter is so complete a type of acute cystitis. Its occurrence thus is not common, and the cystitis must be very severe which is so followed. External violence or over-distension of the viscus by urine are far more frequent

causes.¹ Dilapidated constitutions and aged persons are especially exposed to attacks. It is believed that gangrene occurs in the bladder from the effects of *excessive distension* alone, without inflammation. The pressure of the foetal head during parturition sometimes produces it, and so does the careless or clumsy use of obstetric forceps; the too long-continued stay of a catheter in the bladder, in paralysis of that organ, or in prostatic enlargement, may also cause gangrene of a limited portion. The *rationale* of gangrene from distension is clear. Every tissue is not only stretched, but is compressed; "the vessels and nerves are flattened" (Gross); of course circulation is impeded, and often wholly stopped, and the nervous functions seriously impaired or entirely lost.

Not only obstetric accidents, which might be avoided by due care—and especially by drawing off the urine previous to using instruments—but those connected with lithotripsy are accused of occasionally giving rise to gangrene. The greatest caution is requisite, lest the mucous coat be caught, pinched and torn by the instrument. When this is the case, acute and severe cystitis is nearly sure, and gangrene not infrequent.

Dr. Gross alludes to the fact that an epidemic character seems

¹ An instance of gangrene of the bladder following over-distension, is reported in detail in the *North American Medico-Chirurgical Review* for January, 1858 (p. 96). Dr. Hall exhibited the specimen to the Pathological Society, October 28th, 1857. The patient was a Frenchman, thirty-six years old, who had had urethral stricture. A tight stricture was found, *post-mortem*, "just at the commencement of the membranous urethra." This was considered the primary cause of the retention; the immediate cause being spasmodic constriction at the same place, producing complete closure of the already nearly occluded canal.

Dr. Stillé thought the symptoms were hardly those of gangrene of the bladder, and Dr. Gross remarked upon the very short period of the retention (36 hours, when first seen), and believed it possible that retention might have existed previous to its discovery. "Lymph, he stated, effused from an inflamed bladder, might assume a greenish or dark colour, simply by coming in contact with the urine, and this appearance might simulate gangrene."

"Dr. Hartshorne commented upon the rarity of death from distension of the bladder." The means of relief are usually so promptly applied, that time is not given for the production of fatal lesion. In Dr. Hall's case, it is probable that not only was there previous difficulty of the same nature, but that the man had neglected his bladder longer than was known, or possible to be known, to the first or the subsequent medical attendants. He had not been seen from Saturday night until Monday morning, having locked himself into his lodging-room; and the physician first called to him, took his word that he had passed water, and made no exploration, merely prescribing "a carminative to relieve" pain complained of in the patient's "lower belly."

sometimes to attach to the affection. The French practitioners and others have observed this; and typhoid fever was the malady in which M. Cossy (*Archives de Méd.*, Sept., 1843) noticed the tendency. Coulson mentions sloughing of the bladder after typhus fever, but says nothing of an epidemic character.

The period of access for gangrene varies from a few days to the middle of the third week. Six or eight days is considered a common interval. After violence and wounds, it comes on much earlier, and is rapidly fatal.

The situation of the lesion is various, and, in cases where it arises after instruments have been used, it will be found in the neighbourhood of their chief activity. Idiopathic gangrene has no site of preference. General or partial, it is commonly found in spots not larger than a dollar, very often of the size of a dime.¹

Morbid Appearances.—Those usually attending gangrenous states are observed—a dark purple hue of the mucous membrane, verging, round and in the gangrenous spots, towards a gray or greenish colour; softness, sometimes almost fluidity, of the tissues, which are covered with dirty, sanious fluid, always accompanied by great odor. Infiltration of the submucous cellular tissue is found; the muscular fibres tear readily, and the peritoneal coat is red or dark-coloured, patched with lymph, and sometimes adherent to the surrounding parts. Portions of the dead mucous membrane are occasionally found floating in the bladder, and some have even been passed during the patient's life. In these instances, the mucous coat having been removed to a greater or less extent, the muscular tunic is largely denuded.

8. *Rupture* may be small, and an attempt at repair may be made by throwing out lymph and agglutinating the coats to neighbouring parts. The final result is usually the same. The symptoms are soon those of deep exhaustion, and death is usual in three or four days at farthest. In large ruptures, the chief difference is the rapidity and intensity of the symptoms, and of course the lesions observed *post-mortem* correspond to the extent of the gangrenous action.

General peritonitis, with abundant effusion of a foetid, dark-coloured "mixture of serum and urine" (Gross), is found; lymph thrown out and adhesions are formed between the bowels and

¹ Gross.

the pelvic viscera. The bladder is of course empty, or possibly, if the opening be small, and in an elevated portion of the organ, it may contain a little fluid. Its tissues are softened and discoloured, especially near the ruptured portion or portions.

Prognosis.—This cannot be otherwise than most unfavourable. The condition of the parts, and the frequently weak state of the system, conjoined, are elements sufficient of themselves to preclude the hope of restoration. Instances of recovery are, however, recorded; and, indeed, when gangrene was supposed to be quite extensive.¹ We can hardly conceive this to be well ascertained; as certainly the ratio of danger is directly proportionate to the amount of death of the parts.

Treatment.—If any signs indicate the approach of gangrene, every effort must be made to combat the force of the inflammatory action.² The more intense the latter, especially in worn-out constitutions or in the aged, the greater the peril, and the more should the practitioner be on his guard. The bladder must be watched, as it were, and not the slightest distension allowed. The course is to be changed when gangrene is declared; we shall then soon have indications of exhaustion and sinking, when tonics, with diffusible stimuli will be required.

II. THE PATHOLOGY OF IRRITABLE BLADDER AND OF ANALOGOUS CONDITIONS.

Irritable bladder manifests itself by one striking symptom, viz, *frequent desire to urinate*. The calls may even occur every few minutes. In a case lately observed, where anteversion of the uterus seemed mainly chargeable with the state, we found the patient impelled to pass water nearly every fifteen minutes; some slight indication of cystitis accompanied, she having long been troubled.³

Those who are delicate, feeble, or scrofulous, are said to be peculiarly liable to the affection; and in young persons, of both sexes, incontinence of urine comes on from an irritable state of the bladder.

¹ Gross.

² If none at all be apparent, the case is quite as discouraging; very low vitality being indicated.

³ Four months.

Whilst the whole organ may be affected, the portion around the neck, and the prostatic part of the urethra, are peculiarly susceptible, being, as is well known, very sensitive, even when healthy. Scanty and rheumatic persons are thought to be particularly liable to irritable bladder.

Causes.—These are divisible into two classes: *First*, those which affect the functions of the organ, without special or immediate lesion; and some of which are temporary or easily remediable. Of these, we have, pressure from gravid or displaced uterus; the use of acrid medicines, and especially diuretics;¹ an altered condition of the urine, often readily corrected, as when too acid. Frequently, stimulating drinks, or acid fruits and vegetables, induce the state. General debility; imprudent exposure to cold and dampness, or to excessive heat; venereal excesses; gonorrhoea; intestinal worms; long and contracted prepuce (Coulson. Gross); and every sort of intemperance, dispose to, and aggravate irritability of the bladder.

Secondly, causes liable to prove more difficult of removal, and many of which are followed by organic changes; such are disease of the cerebro-spinal system; affections of any of the genito-urinary organs, and especially stone or foreign bodies, purposely or unintentionally introduced into the bladder; intestinal disorder, especially when in the immediate vicinity of the bladder.

Habit has a powerful influence in maintaining, often in producing, an irritable condition of the bladder; the organ can be *educated* in this respect, and to a very surprising extent. A person may acquire the habit of passing water many times a day, whereas three, or, at most, four passages daily, under ordinary circumstances, are sufficient. The habit, of course, is not irritability, but it induces a susceptibility to yield to the stimulus of small quantities of urine, thus establishing a morbid condition.

Morbid Appearances.—No opportunity, so far as we are aware, has been afforded for ascertaining what lesion, if any, follows a purely irritable state of the bladder, unconnected with some evident cause—local or systemic (idiopathic irritability). When *post-mortem* examinations have been made, nothing affording positive information has been found.

Extreme contraction of the bladder, and thinning of its coats are

¹ Dr. Gross particularly instances nitrate of potash; he has seen it act almost like cantharides. Too prolonged use of alkalies is also mentioned as causative.

noticed after marked cases of the idiopathic variety; there is no congestion or evidence of inflammation, but, on the contrary, extreme pallor of the parts. (Gross.) When the affection depends on local causes, however, such as calculus, urethral stricture, enlarged prostate, etc., there is proportionate accompanying change of tissue. Congestive and inflammatory signs, with hypertrophy of the muscular fibres, are present; the secretions are vitiated, and lymph is occasionally exuded.

Nature of the Affection.—Depending most frequently for its existence, certainly for its intensity and persistence, upon some ascertainable cause, irritability of the bladder takes its tone more or less distinctly therefrom.

In the majority of instances, the sufferers are peculiarly delicate and impressionable. Strong mental emotions of themselves sometimes suffice to induce the difficulty, even in robust, healthy persons, *à fortiori* in others.

The essence of the malady, so far as it can be determined, consists in an exaltation of "the nervous sensibility of the mucous membrane of the bladder," the state being analogous to that sometimes observed in the retina, the fauces, urethra, and other mucous canals.¹ The frequency and rebellious character of the affection in the scrofulous and feebly constituted has been often remarked.

We can easily understand the sympathetic action aroused in the bladder by disease in neighbouring organs, or when some foreign substance is irritating its coats; but many conditions, accompanied by the special symptom characterizing the disease, escape our closest scrutiny. Who would be likely to interpret the cause of vesical irritability such as, on the authority of Howship, was found, *post-mortem*, to depend on a growth of hair within the bladder?²

The action of many causes is at least very marked and immediate, whatever be their *modus operandi*. In one class of cases, such as arise in connection with congestion of the vesical neck, or of the prostate gland and vesiculæ seminales, the explanation seems sufficiently clear; nor is the diagnosis here so difficult as in many instances. We have fulness of the vessels and impeded circulation in the neighbourhood of the very region calculated to cause the expression of the symptoms of vesical irritability, viz., the neck of

¹ Gross. (*Op. cit.*, p. 256.)

² Howship on Urinary Diseases, London, 1823, p. 166.

bladder. The condition, too, is usually observed in young or middle-aged and quite plethoric persons. Dr. Gross believes this to be very similar to that of the retina in certain forms of amaurosis. We have, as might be expected, almost continuous micturition, smarting, and scalding along the urethra, and notably about the neck of the bladder.

Of course, all direct or indirect excitation of the associated organs aggravates the condition. Thus wine, rough exercise, and venereal indulgence become causes of recurrence, as well as of increase.

Onanism, on grounds analogous to those above named, undoubtedly often produces an irritable state of the bladder. We have seen in several young boys (inmates of a charitable institution) an irritable condition of the bladder, followed, in some of them, by incontinence of urine, which was fairly traceable to the practice referred to. Measures being taken to prevent this, amendment followed, and soon no vestige of the vesical affection was observable.

All disordered conditions of the digestive organs, and morbid products or parasites¹ in the latter are fruitful in producing vesical irritability. Acidity of the stomach; costiveness; abuse of the digestive powers by irregularity in taking food, or by its improper quality; the presence of scybala; tumours, either hæmorrhoidal or cancerous; rectal stricture, fistula and prolapsus; ulceration of the rectum and the pruritus often existing about it, especially in the aged; are all incitants, or direct causes, of vesical irritability.

Injuries and diseases of the cerebro-spinal system are not infrequently followed by the affection. Concussion of the spinal cord, from a blow, has been instrumental in inducing constant and imperative desire to micturate, but which declined with the progress of recovery from the local injury. The old, and such as are closely devoted to sedentary pursuits, are most frequently attacked; and congestion of the brain from prolonged study, anxiety, or excitement, is the essentially active agency.

Mental depression, also, and indeed whatever strongly affects the mind, acts similarly. Thus, furious anger and excessive fear, de-

¹ *Ascarides*, most frequently. Mr. Tufnell (*Medical Press* [Dublin], February, 1848) has related a remarkable case where a tapeworm, 30 inches long, was the cause—unrecognized for some time—the symptoms being once or twice relieved by the usual means.

spondency, etc., apparently in the same manner, give rise to the state. Curious instances are related where some source of irritation far distant from the bladder has been found the originating influence; the brain (as already mentioned) and the stomach are perhaps oftenest the regions whence this emanates. The case of Pinel, referred to by Dr. Gross, where disease of the *thyroid gland* was decided to be the cause, is remarkable. It certainly is difficult to explain the action in this instance, admitting the relation of cause and effect. Sympathetic influence from some disease in a neighbouring organ is more easily understood.

That renal disorder is very often the foundation of this vesical difficulty is undoubted. Secondly, the assimilating organs, as Dr. Prout has taught us, have their share of influence. Morgagni remarked excruciating pain in the bladder, the *kidneys* being the seat of the disease; there were large ramifying calculi in them.

Thus persons of every age,¹ and in nearly all conditions of life, are liable. Those imprudent, in any respect, are not only more susceptible, but suffer most when attacked. Undoubtedly, serious structural lesion follows permanently disordered vesical function much more frequently than is supposed; and, not uncommonly, the first step is from the kidneys. Cases which spring from organic disease of the latter organs are considered "very formidable;" they have, according to Dr. Prout, a close relationship with the anæmotrophied kidney affections.

It is believed that not only the strumous and cachectic, but such as have a syphilitic taint, are especially prone to that form designated "the most simple condition of the disease." The oxalic acid diathesis is often quite pronounced, and anæmotrophy of the system exists, especially in the very young. The affection was never observed by Dr. Prout in connection with a marked *lithic acid* diathesis.

Extension of the disease from the kidney down the ureter to the bladder is generally the rule in this class of cases, the mucous membrane being affected by continuity of action. Sometimes, however, trouble begins in the portion of a ureter nearest the bladder, and spreads towards the vesical neck; again, the latter portion may be first affected. This condition has been considered

¹ It is sometimes congenital, or at least occurs very early in life. Prout.

"as nearly allied" to many of Mr. Coulson's cases described as *acute inflammation of the bladder*.¹

If the vesical mucus be ever increased, which rarely happens, it is not so tenacious, nor tending so much to purulence, as that of cystirrhoea. When this state of things is prolonged, the whole system suffers; destructive degeneration attacks the kidney, and phosphatic concretions are often found.

Great influence in the causation of this disease is ascribed to the peculiar cachectic diathesis so often observed in connection with it. A tendency to the formation of tumours, cutaneous eruptions, etc., is often manifested in these individuals: and the spontaneous occurrence of the renal and vesical disorder mentioned is often referrible to inherited predisposition, though of course far more frequently awakened by other and often easily appreciated causes.

In such individuals, a far greater impressibility to the action of various excitants exists. Spirituous liquors affect them more, and consequently they require to be much more on their guard in the use of them. Morbid growths, elongations, and excrescences within the bladder often bring on irritability of the organ. These, and especially fungus hæmatodes, are frequently mistaken for stone in the bladder.

The hæmatoid fungus is sometimes complicated with the above mentioned cachexia, and this is also frequently noticed in persons who have been living in malarious situations. Any violence done to a tumour of this nature, induces hæmorrhage, aggravates the local disease, and, by consequence, its effects: the vesical irritation becomes at last insupportable, and the patient usually sinks quite rapidly.

This aggravation may arise as a result of sounding the bladder, for exploratory purposes. A remarkable instance of this is on record.

The tumour was found to contain "a large quantity of phosphate of lime;" sounding had been resorted to, and hæmorrhage produced; the case went on subsequently from bad to worse, with great rapidity. The *fundus vesicæ* was the site of the fungoid disease:

¹ Dr. Prout says: "I should call it (irritability of the bladder with renal disease) a species of degeneration, rather than of inflammation; that is, of perverted or diseased, rather than of increased, action." (Note on Coulson's cases, and *ib.*, p. 384.)

the mouth of the ureter nearest it was involved, and the kidney the corresponding side had evidently been a long time diseased. The situation of the affection in this instance is by no means commonly observed. Both Sir B. Brodie and Dr. Prout have found it far more frequently at the vesical neck or near it, where greater sensitiveness is to be expected. In the above case, however, irritability was very striking.

It is not difficult to explain the connection of urethral stricture with the present disorder. Whilst the obstruction remains, vesical function is more or less interfered with, and if decided inflammation follow, its extension to the *cervix vesicæ* would be natural.

A marked hypertrophy of the muscular coat of the bladder, and contraction of the organ, induces irritability in many cases. It may be that contracted state of the vesical neck described by Caudmont, of Paris. The bladder acquires the habit of striving against partial obstruction, and the anatomical condition continues the difficulty.

Gouty and rheumatic inflammation of the urethra are noticed by Prout in this connection. He believes them, when they manifest themselves distinct from each other in essence, but that they may co-exist. A gonorrhoeal discharge² is sometimes found accompanying this inflammatory state, and both the prostate gland and bladder sympathize. The irritability is occasionally excessive. Sexual excitement is considered a causative, or an aggravating, element. These cases are very apt to be obstinate under the best treatment. Many persons experience symptoms of irritable bladder just before a gouty or rheumatic attack.³ Scudamore observed that the symptoms sometimes disappeared on the accession of either malady.

The explanation of the condition of the second class of cases, viz., such as depend upon some lesion or disordered function connected with the nervous system, rests chiefly upon two points:—the habit and the sympathetic action following injury of any part of the cerebro-spinal system. Brodie believes many instances of this sort analogous to those which manifest disordered nervous action, as the spasmodic twitching of muscles in other parts—as the eye, facial muscles, etc. Sometimes we have believed such phenomena

¹ Prout.

² See Appendix, Note.

³ Dr. Todd speaks of gouty vesical inflammation; of incontinence and retention of urine caused by gout, and of severe pain in the region of the bladder induced by imprudence in gouty persons.

to be wholly chargeable to over-exertion, either of the particular organ, or of the brain, through long-continued mental effort. The two must be frequently combined. When once a habit of often-repeated micturition is established, it will tell upon the bladder—positive diminution of its capacity occurs, and the condition becomes very difficult of remedy. Prout believed most of these cases conjoined with renal disease or irritation, and that the urine was deranged in quality and increased in quantity.

Those conditions of failure of nervous power attended by fatuity, and others in which, from disease of the cerebral arteries, obstructed circulation in the brain and giddiness supervene, are often accompanied by irritable bladder. In the latter cases, the action is wholly sympathetic, and a correct diagnosis is all-important; for, whilst our prognosis is, of necessity, unfavourable, we may avoid the useless local treatment which a hasty examination might institute.

The influence of *hysteria* upon the bladder is usually temporary, only—although, here, the force of habit may long maintain a morbid condition. This portion of the subject will be again referred to.

Prognosis.—This rests almost wholly upon a knowledge of the *causes*. When we can remove sources of irritation, patients generally do perfectly well. Instances reasonably assignable to constitutional taint, if seen early, may generally be remedied. Long habit firmly rivets the disease, and is exceedingly difficult to overcome. Many of the patient's customs powerfully influence the course and intensity of the affection. If his co-operation be secured, much vantage-ground is gained.

When the symptom is attributable to serious, and especially malignant, local difficulty, it is usually very obstinate, and the whole aspect of the case unpromising. Such conditions, well ascertained, do not justify the least encouragement. Much will depend upon the patient's constitution and powers of resistance. This is equally true of those cases where a cure is not to be expected, with regard to the endurance of the system, and the answering that often-asked question—*How long can the patient live?*

Treatment.—As the causes of the complaint naturally range themselves under two categories, so do the indications of treatment. In the *idiopathic* cases, and in those formerly so-styled, and now, since Dr. Prout's researches, more distinctly referrible to some stomachal derangement, our remedies are systemic. We repair,

so far as possible, the general health, and, above all things, prevent patients from transgressing hygienic laws. Food, clothing, habits, both physical and mental, and especially all excesses, require immediate attention. A thorough examination of the *urine* is also demanded. Generally, we can soon determine whether we have a purely idiopathic or an induced¹ morbid state.

When gout and rheumatism are causative, there is usually acid and scanty urine. To correct this, alkalies are necessary. Mr. Coulson recommends "a combination of potash, soda, and nitre." He joins to this, the acetous extract of colchicum—one or two grains at bedtime. Opiates are also often useful. Morphia, Dover's powder, and anodyne enemata are employed. Faulty digestion must be rectified. Bark, in infusion, and hops in the same form, are excellent tonics when there is failure of digestive power. The diet must be carefully regulated, and all acescent articles forbidden. *Liquor potassæ* and tincture of hyoscyamus, with blue pill, and saline draughts at intervals, and these combined with cupping upon the perinæum and the general warm bath, are highly recommended.

When alkalies disagree, and in nervous patients who have alkaline urine, the mineral acids have been found excellent—and decoction of *pareira brava*, in conjunction, is advised. In the latter class of cases, all causes of depression, over-anxiety, and long-continued study should be avoided. Neutral urine may be advantageously treated by *uva ursi* combined with hops or hyoscyamus. Opiates, in either class of the affection, are beneficial, either by the mouth or rectum; and we have, quite lately, found the best results follow the administration of Dover's powder.

The *diosma* is spoken of very highly, having succeeded after the failure of many other remedies. It may be usefully combined with bicarbonate of soda, tincture of hyoscyamus, fluid extract of sarsaparilla, etc., in cases where squamous eruptions appear—the urine being *acid*—if it be alkaline, the potash must be omitted.

Benzoic acid is strongly recommended by Mr. Thompson in the latter condition.² Infusion of wild carrot-seeds, and the leaves of the *buchu*³ have also obtained great favour. Mr. Coulson refers to the frequent use made of the "spirit of buchu," called buchu-

¹ That is, secondary—consecutive on local causes.

² On Enlarged Prostate: 1858.

³ *Diosma Crenata*, best. (Coulson.)

brandy, by "the Dutch and the natives of the Cape," in all chronic diseases, and even in those which are acute—both of the stomach and bladder. The leaves of the plant are distilled in the dregs of wine. Success has followed the use of buchu in irritability of the bladder and related organs, in England as well as in the countries just named. Dr. Gross, however, says that he cannot give favourable testimony either as regards buchu, pareira brava, or cubebs.¹ Balsam of copaiva he considers peculiarly applicable to such cases as arise after or with gonorrhoea, vesical catarrh, and organic renal disease; it should be given in gum-arabic water.

Injection of the bladder, recommended long since,² has fallen somewhat into disuse. Tepid water, flaxseed tea, the mucilage of quince seeds, dissolved in sufficient water, or similar soothing injections may be employed; but neither Mr. Coulson nor Dr. Gross speaks encouragingly of the method. Anodyne and astringent injections have been used with quite as little effect.

Cases were reported by Dr. Giboin in March, 1837, in the *Bulletin de L'Académie de Médecine*, where decoction of *soot*, duly filtered, was injected into the bladder twice daily, with almost immediate relief to pain, and with the cessation of sleeplessness, of the urgent desire to micturate, and of abnormal urine.

When the affection occurs in young girls, about the epoch of puberty, or during irregular menstruation, a course of ferruginous medicines has been found of great service. The state known as spinal irritation is sometimes combined with the menstrual disorder, and is usually benefited by the same measures.

Myrrh-mixture, and the muriated tincture of iron in infusion of bark, will frequently prove curative. The shower-bath, and free exercise in the open air are also powerful adjuvants. Should these means fail, any local abnormal condition may be sought for by the speculum.

Thus, congestion, displacement, and ulceration, may be effectually removed, and vesical irritation with them. When hysteria is added to, or causative of the condition, we may, in conjunction with the means above enumerated, give valerian or assafoetida; and the bowels may be opened by a brisk aloetic purgative.

The serious diseases which affect the female generative organs

¹ Cubebs, or anything peppery, we should suppose inappropriate.

² By Mr. Jesse Foot, Mr. Wadd, and others.

and the parts closely related to them, such as the ovaries, the uterus, the pelvis, the lower intestines, especially the rectum, frequently occasion extreme irritability of the bladder, and generally such cases are very obstinate, and difficult even to relieve.

Displacements of the uterus often admit of correction, so that when causative, by pressure, or dragging, we may hope to cure the complaint by replacing the deviated organ. Such a case, now in our hands, has been much benefited by a bandage; although but few days have elapsed since the patient was seen, and she had been suffering for nearly four months, unwilling to disclose her complaint.

Should worms be suspected, of course the first resort is to anthelmintics. The expulsion of the parasites is sometimes attended with immediate disappearance of the signs of irritation. Turpentine, calomel and rhubarb, chenopodium, and, for ascarides, enemata of lime-water, will generally remove both cause and effect.

Morbid growths in or about the rectum, ulcerations, sinuses, etc., must be treated by the usual methods.

Diseases of the *vesiculæ seminales*, the effects of venereal abuses, and the general attendant debility, must be met by tonics, vigorous out-door exercise, cold bathing, active, cheerful, mental occupation, great attention to the functions of digestion, regularity of the bowels, and all the means so familiar to practitioners.

Cauterization of the urethra, if there be positive spermatorrhœa, usually cures both affections at once, if judiciously practised. Elongated and very contracted prepuce—a not infrequent cause of vesical irritation—will be best treated by circumcision, or if not excessive, by simple incision.

We have found the tincture of cantharides to succeed in cases where the irritable state of the bladder originally gave rise to both diurnal and nocturnal incontinence of urine, the disorder being undoubtedly prolonged by the influence of habit. Many writers refer to good results obtained by this medicine. A few drops—the dose varying according to the patient's age, and repeated twice, thrice, and sometimes oftener, daily, frequently remove the symptom very quickly. In a case of this sort, we lately found the remedy effectual, after trying many other means in vain. Between one and two drops only, four times a day, the child (a female) being nearly three years old, relieved the condition in two days, and in a week there was not a trace of it. The child was perfectly healthy,

and had been carefully watched by the mother for a long time; punished for what was considered *the trick* of wetting herself; taken up at night two or three times, shortly after going to bed; restricted in the amount of fluids taken, etc., without avail.

The successful use of the cantharides seemed a great relief to the poor child from the constant annoyance, both in the act of passing water, and by the excoriation caused by the continual flow of urine about its thighs. It also escaped a frequent whipping, which, of course, was wholly undeserved.

In punishing children in these cases, great discrimination is needed, for it is not easy to say when this, sometimes very requisite method of treatment, should be resorted to. Doubtless there are many children whipped for frequent micturition, who should not be, whilst others escape, who richly deserve it. Mr. Coulson aptly remarks upon this point, that the object of punishment should be kept in view, viz., to call attention to the first warning of a desire to micturate, "so that the child may anticipate, by an act of will, that degree of distension which enforces the sequence, and which, when it has arisen, no effort of the will, even under the dread of punishment, is adequate to resist." (*Op. cit.*, p. 100.)

Great attention, especially in the case of children, should be given to the condition of the urine, for it would be wrong to punish a child for an act to which he is, so to speak, chemically constrained; whilst another, who passes perfectly healthy urine, and is only negligent or influenced by a bad habit, will do well under shower baths and the *essence of birch* smartly applied externally! We have seen several cases of both descriptions, within the past year. Thus frequently and accurately does a thorough diagnosis guide our treatment in this class of affections.

In correcting morbid states of the urine, various indications arise, both in adults and children. Scanty and acid urine demands the alkaline carbonates, soda or potash, or both combined. Twenty grains, in two ounces of water, is an average dose for adults, and should be taken an hour or two after meals. Hickory lye, calcined magnesia, and oxide of bismuth, may be added to the above, although they are not considered so reliable as the former.¹ A strong infusion of *uva ursi* and hops makes a good vehicle for the medicine.

¹ Gross.

The opposite condition of the urine is usually corrected, and its resulting effects annulled, by the acids. Dr. Gross gives *nitric acid* the preference over either the muriatic or sulphuric.

When there is actual lesion of the nervous centres, whilst the only treatment to be thought of is that suited to the general state, we can hope for little, if any, amendment. When possible to ascertain precisely, or nearly, the seat of congestion, or of graver difficulty, we can act more advisedly, than when, as is so often the case, the manifestations are very obscure.

The local application of belladonna, and other narcotic substances, has been found of service. Belladonna is also used internally. When neuralgic pain affects the bladder and its neighbourhood, the remedy is thought to act favourably. A few small doses may be given daily. It is best always to begin with such and watch carefully the effects of the drug. A sixth and fourth part of a grain of the extract, three times a day, is recommended. We have seen effects produced by smaller amounts, at the same intervals, and these have apparently been increased by the application of the aqueous infusion externally. Belladonna plaster and opium are similarly employed, being applied warm, to the sacrum or hypogastrium. An ointment of the same nature has also been serviceable.¹

In this affliction, and in the analogous one of vesical spasm, the external use of chloroform might be tried with advantage.

Dr. Churchill has lately reported a case² where the local application of *carbonic acid gas* to the vagina, gave great relief to the distressing symptoms. The patient had suffered for nine years, and all measures had failed.

A few other medicines have had zealous advocates at times. The *Phytolacca Decandra* was a favourite with the celebrated Dr. Physick, who gave two-drachm doses of the saturated tincture every seven or eight hours. The use of Haarlem oil has also proved successful, when other remedies have failed. It is administered in mucilage of gum Arabic, or in sugar and water, and in the dose of from ten to twenty drops twice or thrice in the day.

The treatment of *Cancer of the Bladder*, which, idiopathically, is

¹ Gross.

² Dublin Quarterly Journal of Medicine, Aug., 1857; Ranking's Abstract, No. XXVI., 1857.

so rare¹ that Dr. Prout says he has never seen an instance where it appeared originally in the viscus itself, or its appendages, must rest mainly upon general grounds. Propagated, as it almost constantly is, from the uterus or rectum, we have to deal with an affection against which we cannot hope to strive effectually. Fungus hæmatodes is, of course, incurable. The only thing to be done is to palliate suffering by sedatives and anodynes, administered by the mouth and rectum, and to restrain and repair, so far as may be, the loss of blood which always occurs.

The medullary form described by Travers, and spoken of by Coulson, Rokitsansky and others, is infinitely the most common. Soft, very vascular vegetations, arising first from between the mucous and muscular coats, project at last into the vesical cavity, and bleed at the slightest touch. The form of cancer spoken of as "fibrous" by Rokitsansky, Mr. Coulson had never seen. That propagated from the uterus and ovaries, he does not consider a true example, even when the tissues are rendered thick and nodulated.

The particular localities affected by cancer are the vesical neck, the trigon and posterior wall. Cases are mentioned where a sacculated bladder has been filled with cancerous vegetations within the pouches, and retention of urine is sometimes caused by the pressure of the mass thus formed.²

The cancerous tumours may be numerous and small, or sparse and large.

Scirrhus of the bladder exists but very rarely. Dr. Gross has seen only one case in a practice of twenty-five years, and most authors ratify the opinion of its infrequency. It is believed to be more common in males than females, and to occur oftenest between the ages of forty-five and sixty years. The neck and fundus are the most usual seats. Firm scirrhus tubercles and ulcerated cancer are found on dissection, the bladder being contracted, and pus, lymph, and blood, mixed with the fetid urine. It is difficult to explain cancerous disease of the bladder, except in those cases where there is evident extension from neighbouring organs. Observers are not quite satisfied that mere local irritation would cause it, as in calculous cases, etc. The fungous growths connected with dead bone, diseased teeth, etc., as referred to by Mr. Coulson, are not necessarily cancerous. There may be instances of similar non-malignant growths

¹ See Appendix, Note V.

² Gross.

in the bladder. We certainly have seen patients with the gums in such a state as to be pronounced cancerous, on a hasty examination. One old man, not very long since, was relieved of his apprehensions of a speedy and painful death from "cancer" of the mouth, by the extraction of a decayed tooth-fang. These instances are almost too common to mention; but, although the same state may sometimes exist around a foreign body in the bladder, it is not probable that all the symptoms of true cancer would arise, unless the taint were infecting the blood, and the disease, in most cases, seated in neighbouring organs also.

Fistulæ, formed by ulceration consequent on cancerous disease invading the bladder and rectum, are hopeless of repair, and the patient's state becomes still more distressing.

That cancerous growths within the bladder should cause irritability of the organ, can surprise no one; and the affection is therefore suitably noticed under this general head.

Opiate suppositories, to quiet the irritable state; and tincture of the muriate of iron, acetate of lead, galls, quinine, and mineral acids are advisable during and after hæmorrhage.

The same remarks mainly hold true of *tubercle* and of *polypus vesicæ*, both confessedly rare affections. Rokitsansky refers most cases of tubercle of the bladder to extension from the sexual organs. The vesical mucous membrane is but infrequently the seat of tubercle, yet it may exist there alone. Mr. Coulson has only twice seen tubercle in the bladder; once in the mucous membrane near the urethral orifice, once beneath the peritoneal coat and at the fundus of the organ.¹ When studding the exterior surface of the bladder, it will generally be discovered that some neighbouring organ is affected; the uterus and ovaries in women, the rectum or prostate gland in males.

The individuals are usually found generally tuberculous.² In all but one of the cases of tubercle of the bladder reported by Dr. Gross (six cases), great irritability of the organ was a marked condition. Ulceration was found in all, *post-mortem*, and in some there was nearly complete destruction of the mucous coat. Dr. G. believes that tubercular disease may be predicated in all extensive ulcerations of the bladder, and thinks the affection is analogous to fol-

¹ "The cervix and fundus of the bladder are the main seat of tubercle." (Rokitsansky.)

² Coulson.

licular ulceration of the bowels, so common an attendant upon phthisis.

Polypi are mentioned as rare productions in the interior of the bladder. Dr. Baillie saw only one instance; but then the bladder was nearly filled by them, and the tumour was very irregular in shape. Coulson relates an interesting case, where an operation was done by Mr. Crosse of Norwich, England, for removal of an excrescence of this sort from a child one year and a half old. Stone, possibly encysted, had been thought of, but great doubt was entertained. On cutting, several small tumours protruded; there was no stone. The tumours very closely resembled nasal polypi; some were extirpated by scissors, but several were found so broadly attached, that it was judged inadvisable to remove them. The little patient died in forty-four hours, having suffered intensely. The ureters were found enlarged and tortuous; there were no traces of peritoneal inflammation, nor any wound of the rectum in operating (which had been feared); the renal pelves were dilated to the capacity of nearly two ounces each; there was great thickening of the muscular vesical tunic, and at the fundus "a firm mass of thickened cellular substance situated external to the muscular coat, and containing a small central cavity, filled with pus."¹ Numerous other tumours were found, and these had arisen from a diseased mucous membrane; certain of the bodies were loose in the vesical cavity. Dilatation of the vesical neck and of the prostatic portion of the urethra, allowed of the tumours dropping into this part of the urinary passages, and thus accounted for a "fulness" perceived in the perinæum.

Mr. Coulson also refers to cases of polypus of the bladder reported by Collison, Petit and Covillard, and to the successful extirpation of a tumour from the inside of the bladder by Mr. Warner. (*Philos. Transac.*) Success must be rare, we should suppose, in such cases, yet prognosis would hardly be so discouraging as in cancerous and tuberculous disease of the organ, affections in which no reasonable hope can be entertained.

Stomatous growths and a peculiar form of fungous excrescence, described as a vegetation of the mucous membrane, have been observed. Gross found the latter associated with stone.

Removal, when practicable, is, of course, the procedure to be

¹ *Op. cit.*, pp. 215-16.

adopted. Cutting forceps were advised, long ago, by Le Cat. The chances must be very much less favourable for the patient than in lithotomy, because we have a wounded surface, some risk of bleeding, and there is great difficulty in knowing whether all the tumours (supposing more than one) are eradicated.¹ The crushing and torsion process, advised by Civiale, in 1834, hardly finds favour with surgeons. Scissors, or the forceps above mentioned, seem the best instruments.

Any special treatment for tuberculous bladder, is of course, impossible. As we have remarked of cancerous states of the organ, whilst the condition is discouraging in the extreme, the treatment is of necessity general, and its power little or none, except in the way of alleviation. It has been truly said, that it is far easier to harm than to benefit the patient by treatment, in cases of irritable bladder arising from *ulceration, polypous excrescences,² elongations of the lining-membrane of the bladder, enlargement of the prostate, etc.³*

Constitutional measures are often of the highest importance, and especially in view of the exhaustion induced by pain and various discharges. Unless carefully watched, the patient may die of inanition.

III. SPASM OF THE BLADDER.

This somewhat analogous state differs, as may be gathered from its title, from the irritable condition, in having complete intervals. Pain, beginning in the bladder and running along the urethra to the end of the penis, with violent, and usually ineffectual, desire to micturate, and, by reason of the firm pressure of the contracted bladder upon the rectum—to defecate also, is the condition during an attack. Occasionally, the urine is thrown off spasmodically, by jets.

A type of the affection is seen in what is termed a fit of the gravel or stone, and it is well known that vesical calculus is nearly always attended by spasm. The sphincter (*i. e.* the muscular fibres around the internal urethral orifice; *vide* page 284) is very liable to contract spasmodically and painfully in gonorrhœal difficulties, espe-

¹ Desault, during lithotomy, took one away with forceps; Deschamps left one in the bladder after lithotomy.

² Laugier.

³ Probst.

cially when they are mismanaged. Urethral injections, either too strong, or employed too soon, induce spasm, and are likely to be followed by inflammation. Death has occurred during this abnormal state of the bladder—and the ureters, together with the renal pelvis, have been found dilated by urine, the orifices of the former having been tightly and spasmodically closed.¹

Many other influences may awaken vesical spasm:—The use of certain medicines and articles of food; acrid urine; renal abscess; organic disease of the bladder; retention of urine (voluntary or *vice versa*); venereal excesses; and notably, disease of, or parasites in the rectum—*ascarides* are particularly obnoxious to the charge.

Nature of the Affection.—Two sets of causes are influential—the local and systemic. In each, an excessive exaltation of the nervous susceptibility is produced. The effect of this state is, very frequently, to exhaust the nervous tone and energy of the bladder, and *paralysis* of the organ,² the entirely opposite condition, results. The affection is sometimes completely sympathetic with disease in the adjacent organs; sometimes, it is believed to be owing to suppression of the gouty paroxysm, and it is occasionally conjoined with inflammation.

Treatment.—The attacks referrible to a gouty complication are best relieved by sinapisms so applied as to invite the affection to the spot whence it has been repelled, whilst anodyne measures should be resorted to, locally and generally. Co-existent or impending inflammation must be met by leeches, cupping, fomentations, and the warm bath. Calomel, combined with anodynes, is spoken of favourably. Mr. Cline recommended the muriated tincture of iron in small doses, often repeated, where retention of urine, uncomplicated by inflammation, is present. When hysteria contributes to the complaint, antispasmodics with tonics best fulfil the indications. Camphor, musk, and valerian, are mentioned. We have found the latter very serviceable.

Tobacco, either by the mouth or by enemata, has been directed, with a view to overcome the spasmodic action. Its great power is acknowledged, but it is a dangerous agent. Many advise that it be discarded from the remedial list.

The condition described by Dr. Gross as *Neuralgia of the Bladder*, is a paroxysmal malady so analogous to *spasm*, that he probably

¹ Coulson.

² Often otherwise produced.

intends the same affection. At all events, his description answers that of the latter very closely; and we do not find that he notices it under the present title, which he doubtless would have done, did he not regard it as essentially the same. In one of his reported cases, he uses the word spasm to denote an existing condition of the bladder. That there are, however, two distinct affections is undoubted—that both are frequently united in the same individual is also a fact, distinctly recognized by experienced observers. Civiale considers the subject of neuralgia of the bladder, and particularly of its neck—at great length. He often found the general health greatly impaired, and his treatment was constitutional as well as local—circumstances being his guide.

Cauterization has occasionally proved beneficial. If there are no evidences of inflammation, depletion is not to be thought of, unless the patient be very plethoric and sedentary. The soothing means at our command—and particularly anodyne enemata and suppositories, with outward applications of similar nature, should be employed. The gum-elastic bougie is sometimes useful in assisting to quiet the morbidly sensitive, spasmodic, neuralgic condition of the urethra and vesical neck.¹ Civiale relates an amusing case which shows such a truly French *insouciance* of modest retirement in attending to nature's requisitions, that a part of it is worth insertion.

The patient, a carpenter 30 years old, had vesical neuralgia, combined with spasm, and sometimes retention, at others spasmodic issue of urine. There was also a certain amount of vesical catarrh. All calmative treatment failing, Civiale tried the *bougie* with excellent effect—witness his account: "On the 15th day of treatment, the patient came running to me to announce himself completely cured, because, said he, 'I could pass water in the garden of the Tuileries, which was crowded with people.'² So satisfied was he with this result, that he afterwards took the pains to go down into the street, in order, as he said, to have the pleasure of urinating in public, a thing he had been unable to do for years."

¹ The use of a medicated composition-bougie, or of one smeared with anodyne ointment, or propelling a little before it down to the cervix vesicæ, might be tried in these cases.

² Civiale naïvely states that the man could not urinate, previously, *when conscious of being observed*. This is not usually thought very abnormal, we believe. We do not doubt that the presence of a crowd, which would have a retentive action on most people, would *expedite* the urinary flow from Gallic bladders!

Catheterism and the use of the bougie, at first very painful in these cases, are gradually well borne by most patients. Injections, both of warm and cold water, with occasional purgation, are useful. Dr. Gross does not coincide with Civiale as to the success following the employment of the bougie. He has, indeed, renounced its use, considering the suffering very extreme (which, indeed, is not denied by the French surgeon), and that, not infrequently, aggravation of the difficulty ensues. This may be true, yet, when carefully managed, the measure has certainly succeeded when every other means has failed. Tepid or cold injections of acetate of lead and opium, or of "a watery solution of opium and hyoscyamus" (Gross), are not open to the objection of causing pain during their administration, at least, such must be very slight.

The usual counter-irritants to the sacrum, perinæum, upper and inner part of the thighs and the hypogastric region, are frequently resorted to in severe and obstinate cases. Tartar-emetie ointment is justly repudiated by many good authorities. In our own experience, wherever applied, it has proved a distressing, often a useless, and sometimes a positively injurious agent.

The moxa and caustic paste issue are very efficient in certain cases.¹

We again refer to the use of chloroform externally, a measure we have found wholly successful in many local neuralgic conditions: and although it might possibly be less efficient in these affections, it deserves a trial.

The strictest precautions as to imprudence in diet and exposure should be enjoined. Whatever, either in food or drinks, is likely to induce acidity and flatulence, must be avoided. Sudden alternations of temperature should be guarded against, and violent mental action, together with strong manifestations of the passions, of whatever class, be discouraged.

Whatever induces congestion of the parts also, as protracted sedentary occupations, venereal indulgence, etc., should be at once abandoned.

The remedies believed to have a special influence upon the system when affected by neuralgia in other parts, are sometimes useful in conditions of purely nervous pain of the bladder. When spasm

¹ Gross.

exists alone, anodyne and soothing measures are the most strongly indicated.

In vesical neuralgia, carbonate of iron, arsenic, strychnine, aconite and quinine are prescribed with varying advantage.

We believe that much is often effected by the latter remedy. After bleeding (if necessary) and suitable evacuations from the bowels, both quinine and arsenic produce marked effects. Dr. Gross relies far more upon them than upon iron. Four grains of quinine every three hours, until fifteen or twenty grains are given, and then a discontinuance until the next day, is his plan, and he finds better results than by crowding the remedy, as is too frequently done.

The following is his formula for the administration of *arsenic*, when the disease has been modified or subdued by the above measures, and for the purpose of "eradicating" it:—

R. *Acidi arseniosi*, gr. ij ;
Strychnis, gr. j ;
Extracti aconiti, gr. viij ;
Pulv. opii, gr. v.—M.

The articles being incorporated with great care, the mass is to be divided into sixteen pills of equal size; one is given every six hours, or four in the twenty-four hours. (*Op. cit.*, p. 269.) The best effects have followed the use of this combination.

Of the narcotics, opium has the preference, and morphia or its salts succeed best. A nauseant is sometimes advantageously added. An emetic of ipecacuanha or antimony has been known to cut short a paroxysm of vesical neuralgia; and this measure is thought peculiarly suited to cases arising in "malarious districts" and "associated with gastric or bilious disorder." *Spasm*, reasoning from analogy, might be benefited by a nauseant. The valerianate of ammonia, now deservedly enjoying a reputation in neuralgic affections, might be tried with advantage in those of the bladder.

In all neuralgic disorders, fomentation or steaming of the parts has been found at times very efficacious. Perseverance, however, is necessary; oftentimes, the pain yields suddenly, and now and then permanently, just as we are about to relinquish the trial of these means. Hot water, bearing the fumes of laudanum to the part, we have found successful, after abandoning many other remedies, in facial neuralgia. In that of the bladder, the vapour may be easily conducted beneath the bedclothes by an elastic tube, to

the vesical region. The flexible tube may be adapted to a vessel placed over a common nurse-lamp.

The *douche* has been strongly recommended in this class of cases, especially by Civiale. In atonic states of the bladder, the simple cold water *douche* is advised, but warm and medicated ones are also serviceable. Proper attention must be paid to maintain an open condition of the bowels, and the effects of the *douche* must be closely watched.

Recurrence of neuralgic and spasmodic attacks is common in the bladder, as elsewhere. Rigid hygienic precautions, if observed, are ordinarily preventive of a return, and should there be one, the prompt resumption of the usual means will generally succeed in quelling the malady. Remedial measures should be prolonged for some time after apparent recovery.

Age modifies all treatment to some extent; we should never neglect any evident indications thus furnished. Although by far the greater number of cases occur in the middle aged of both sexes, still these affections have been observed in infancy, and, as is well known, are by no means infrequent in advanced life. With young men, excessive venereal indulgence is a prolific source of these and cognate troubles. They, therefore, especially in view of a recurrence of the affection, should be duly warned. Civiale says that too prolonged continence may be followed by similar symptoms. "*In medio tutissimus ibis!*"

Hunter, long since, very sensibly advised against long journeys and rough exercise, especially on horseback and in cold weather. These precautions should be insisted on, whether there be only temporary and recurring spasm, a neuralgic state, or a combination of both—anything, in fact, constituting true *cysterethismus*.

IV. PARALYSIS OF THE BLADDER.

A partial diminution of contractility hardly deserves the appellation of paralysis; yet there are conditions, variously caused, productive of such a state. Phthisical patients, and those very feeble from other causes, experience this deficient expulsatory power of the bladder. We know that it often accompanies declining years, and is present occasionally, to a very annoying extent, even in middle life. A very frequent cause is the habit of retaining the

water too long, and, by force of will, overcoming the strong expulsive effort. Instances of this sort of *inertia vesicæ* are common. The effects of one or two such injudicious coercions of nature may be well recovered from; but, if frequently repeated, they prove most deleterious. The restrictions of society, or the inconvenience of leaving an assemblage, often lead to neglect of the bladder.¹ The lack of public urinals in our large towns is a lamentable and crying evil. Strangers must frequently suffer, and doubtless much permanent injury is thus induced. The over-nice delicacy which ostracizes these conveniences, and the short-sighted policy which, on the part of real-estate owners, even at a distance from private dwellings, forbids their erection, is greatly to be regretted. Properly built and attended to, they need be offensive neither to modesty nor the olfactory sense.²

Besides the partial and temporary inaction spoken of, accompanied, as it is at times, by complete suspension of vesical contractility, we have those paralyzed states which are *entire*, and nearly always permanent, such as result from disease of the spinal cord. These are often gradual in their accession, and connected with similar conditions of the general muscular system.

By a remarkable peculiarity, partially explicable by anatomical construction, the bladder, when paralyzed, *retains* the urine, unless, indeed, it be for so long a time and so completely filled (no relief having been afforded instrumentally) that *incontinence* of urine comes on, as in a case previously referred to,³ narrated by Mr. Lawrence, of London, who relieved *by the catheter* this species of incontinence. Five pints were drawn off, and the medical attendant, who had considered the case one of remarkably *irritable* bladder, must have been both diagnostically and therapeutically enlightened.

There is a weakness of the bladder which allows of only a partial evacuation of its contents, and induces a state so similar to irritation that it is likely to be mistaken for it. The bladder in these cases acts upon a *certain amount* of urine, but always leaves some behind; the contraction is feeble, and the urine which

¹ Several instances of this, with, in one case, an obstinate persistence of *pubic* expulsive force, have, not long since, come under the writer's observation.

² The almost entire lack of public urinals in most of our cities, as also in Great Britain, is more objectionable than their redundancy in the French capital.

³ Part I. page 113.

remains is liable to become foetid and unhealthy, occasioning irritation and a sort of incontinence from its quality, not its quantity. Whilst very little urine, even, remains in the bladder, its contractility is evidently imperfect, and will not be restored without the surgeon's most assiduous attention. It is always prudent to ascertain the nature of the affection by the introduction of the catheter.¹

The essence of that paralyzed condition resulting from cerebro-spinal disease seems to be, *first*, a diminished sensibility of the organ to the stimulus of the urine (Lallemand); from this results, *secondly*, distension, from the mere fact that the patient, not feeling a desire to micturate, unwittingly allows the accumulation. Finally, the urine dribbles away, and the condition, sufficiently grave at first, is likely to be misinterpreted and become worse. The same explanation serves for the instances seen in old persons, and especially in the gouty and rheumatic. The nervous power and healthy sensitiveness of the organ is impaired, and the will has less control over it. There are several reasons for difficulty of this sort in elderly persons. The gradual diminution of general nervous power, manifested, more or less, in all the muscles, is one. Not readily responding to the stimulus of the urine, there must be distension, as already mentioned. Then, again, in old men, the prostate is very often affected in some way; generally, there is partial or entire hypertrophy. Here there is an indirect, or, as it is well termed, a "secondary," paralysis, brought on by over-exertion to subdue an obstacle to the flow of urine.²

It is believed that simple, uncomplicated paralysis of the bladder is rarer in old age than has been supposed. Dissections do not disclose any actual wasting of the *detrusor urinæ* or other muscular fibres. All authorities are agreed upon this point. Rokitansky remarks that atrophy of the vesical walls is a very rare occurrence. Mr. Coulson, although he admits that they may be thin, in old persons, has failed to find any evidence of degeneration of the fibre, or that pallor which generally marks its impairment. In true atrophy, we have partial, and often nearly total, disappearance of the muscular fibre; and, of course, the contractibility of the viscus is lost.

Genuine paralysis of the bladder being, in fact, infrequent, those

¹ Patients sometimes learn to catheterize themselves. See Appendix, Note CC.

² Coulson.

states represented by the patient, and often believed by the physician to be such, are, in a great majority of cases, referrible to some obstruction of the urinary flow. Subsequent *inertia* may, it is true, arise from over-distension.¹

There are several causes which give rise to a *quasi* paralytic state of the bladder. Thus, after labour, and especially after frequent child-bearing, there is a feebleness of contractile power in the region of the vesical cervix, which usually disappears a few weeks after confinement. Disease about the rectum, and the removal of hæmorrhoids sometimes induce this state, and so does the frequent use of opiate suppositories. Of course, these conditions are not true paralysis, yet, temporarily, they cause great annoyance. Excessive distension of the rectum by flatus, foreign bodies, or morbid growths of any sort, may induce the affection by pressure on the *cervix vesicæ*, or on the urethra. A case of disease of the hip-joint is related, where pus, escaping from the joint, pressed upon the neck of the bladder, and induced a paralytic condition.

Various displacements of the womb, as is well known, have an effect upon the viscus. In early pregnancy, the pressure of the womb (even until the fifth month) may actually stop the passage of urine, and minor degrees of the obstructive tendency will, of course, be remarked. At or very near confinement, we frequently have similar difficulty. Retroversion and prolapse of the uterus, together with dragging down of the rectum and vagina, are the principal displacements causative of the affection.²

Imperforate hymen, with retained menstrual secretion, has occasioned retention of urine, simulating true paralysis.

Hysterical manifestations may closely imitate this vesical difficulty; and here a subtle diagnosis is often requisite. It is true that a profuse flow of limpid urine most usually characterizes hysteria, but there are numerous instances of that unfortunate pruriency, both of the mind and the generative organs, which leads to voluntary retention of urine in order to invite manual intervention. Sometimes an actual loss of expulsive power results.

Violent contusions, kicks, jamming of the pelvis between a carriage and a wall, or between two vehicles, etc., have paralyzed the bladder. This is analogous to the accidents of labour already

¹ Mr. Henry Thompson declares "there is no evidence of the existence of true paralysis limited to the bladder." (*Enlarged Prostate*.)

² Desault; Coulson, *et al.*

mentioned. Sometimes the awkward use of the obstetric forceps has a like effect.

We are referred to instances of vesical paralysis following severe *cystitis*; in this class of cases, the muscular tunic is overwhelmed by the violence of the disease, and is paralyzed, "as the small intestine is in acute peritonitis, or the orbicular muscle of the eye in certain forms of conjunctivitis."¹ In slighter *cystitis*, the action is analogous to the irritable one causing rectal tenesmus—a condition attended by frequent ineffectual desire to micturate. In those instances where the muscular power is thus *crushed*, the urine is fetid, thick, of a high colour, and sometimes bloody.

Morbid Appearances.—Dilatation of the bladder, with thinning of its coats; the mucous membrane pale; sometimes blanched. If renal disease has coexisted, and inflammation also, the vesical mucous membrane is red in some portions, and slate-coloured in others.² The ureters join in the inflammatory appearances, and so do the renal *pelves* and *infundibula* when the disorder has been severe. Foetid urine and deposits of phosphate of lime are found in the bladder, and ulcerations are occasionally noticed.

Dr. Gross remarks the presence of blackish or dark-gray spots, indicating incipient gangrene. In very violent cases, or in those not properly relieved, softening and rupture of the vesical tunics sometimes take place.

The distinction of paralysis of the bladder into that of the cervical portion and that of the body of the organ, is believed by many observers to be important. Gross, referring to Zubert and Soemmering, states that the former is attended by *incontinence*, the latter by *retention* of urine. It has already been seen that extreme distension of the organ, resulting in a species of paralysis, may sometimes be followed by incontinence, so that, in either case, whether the neck alone, or the body, be affected, we may have that symptom.

Prognosis.—This almost wholly depends upon the cause, but somewhat, also, upon the promptness and efficiency of relief. Neglected cases rapidly become desperate. Four or five days' distension will generally ruin the tone of the organ forever. At so late a period, catheterism will hardly save the patient's life.

Organic disease, especially of a cerebro-spinal nature, generally

¹ Gross, *op. cit.*, p. 279.

² Coulson, *et al.*

precludes all hope of recovery. In young persons, and when the causes are remediable, a successful result may be anticipated, if early treatment be adopted.

Treatment.—First, we relieve, at once, the existing difficulty, by the use of the catheter, and this must be continued so long as it is absolutely demanded. That it may be too long employed, we have ample proof. Thus, indeed, a permanent state of vesical feebleness might be induced, by accustoming the organ to artificial relief. So soon as, on careful trial, we observe indications of a return of the natural expulsive power, we intermit the passing of the instrument, and watch only for its necessity. The patient should be frequently made to test the evacuator power. In the use of the catheter, great judgment is necessary; for whilst we may overdo, a worse thing would be to leave the bladder too long unrelieved. As a general rule, the affection being a decided one, every four or five hours is a good interval. This will be regulated, however, by the practitioner. If he observes only a moderate amount of urine to be daily secreted, he should diminish the number of operations; and *vice versâ* under the converse conditions. Improvement is sometimes more speedily and permanently attained by keeping a catheter in the bladder, and letting the urine flow every hour or two. Great care must be taken to cleanse the instrument every other day at least. This is believed particularly useful in cases combined with pain and spasm about the cervix vesicæ.¹

Caution is necessary, in extreme distension, not to draw off all the water at once. A sort of collapse may result; much as occurs in removing ascitic accumulation, if the precaution of swathing the abdomen and properly drawing the bandage be not attended to. Dr. Gross even uses the swathe in such patients, as is done after parturition and in tapping for ascites.

In hysterical cases, we must be cautious how we indulge the patient in catheterism. It should not, at all events, be too early resorted to. Brodie, Prout, and many others teach us this, whilst advising the requisite circumspection. If permitted, such patients will keep up the state for months. When satisfied of our diagnosis, it is best to refuse the operation; firmness on the part of the surgeon usually procures a speedy evacuation. Of course, all proper caution is presupposed, in deciding upon this course, for, if a mis-

¹ Coulson. Gross.

ake be made, and too much rigour used, irremediable mischief may follow. The antispasmodics, especially assafoetida—and by enema often—with valerian, and sometimes morphia, are demanded. Mental hygiene and the improvement of the general health, with change of the habits of life, are essentially needful.

The greatest gentleness and care are requisite in passing the catheter, in all cases of paralytic conditions of the bladder; but especially is this true in those arising from disease of the spinal cord. Violence here, would produce great injury. From the lack of sensibility of the parts, perforation or lesion of a serious nature might result; both abscess and ulceration have been known to be caused by injudicious force in these cases. When imperforate stricture of the urethra exists, the case must not be tampered with; generally, puncture of the bladder can alone save the patient. There are cases, in old persons, where the use of the catheter is required through life, no relief being possible by any other method.

Such patients may be taught to pass the instrument themselves. As large a catheter as can be borne should be used. When there is vesical bleeding, the instrument should be longer than usual (four or five inches).¹ Its curve will vary according to the requisitions of individual cases. Often the proper use of the catheter is sufficient to remove the difficulty.

Constitutional Measures.—The remedies suggested by any concomitant, or causative, condition of the system, will, of course, be put in requisition. Great attention to the general health, tonics, and whatever remedies are demanded by that general debility which is sometimes accompanied by a like state of the bladder, should be directed.

In this weakened condition, arnica in tincture, forty or sixty drops, *ter in die*, is advised,² carefully watched, it has been found very useful. All displacements and diseases of neighbouring parts, as the uterus, rectum, urethra, and prostate, demand an immediate and persevering attention.

Strychnine has been used with great success in certain cases. Dr. Baly, at La Pitié, is said to have cured three cases in less than a month, by doses of from one-tenth of a grain to two grains,³ every twenty-four hours. M. Petrequin has reported similar results in

¹ Coulson.

² Gross.

³ Stated by Coulson, from the *Gazette Médicale*. The amount (two grains daily) if continued, seems enormous.

paralysis of the bladder from spinal injury. Dr. Gross uses *nux vomica*, either singly or in conjunction with *cantharides* *arnica*. Due attention should always be paid to evacuating bowels, prior to the use of this, or any other special remedy. gation, therefore, should immediately follow the evacuation of urine by the catheter. Dr. Gross thinks calomel, jalap, *rhu* and sometimes aloës, combined, a suitable cathartic. Enemas somewhat stimulating nature, in the absence of inflammation should suppose would be highly serviceable. Indeed, they are advised by Dr. Gross, who uses turpentine thus, and by the m also.

If the urine be abnormal, corrective medication directed to this state is essential. When alkaline, and mixed with str mucus, injections with water, impregnated with a small quantity nitric acid, are beneficial.¹

Sometimes emetics have been found of service; this is in cases depending on a general *inertia* of the system, and on a gish, or disordered digestion. The mechanical action of the rei may aid in expelling the vesical contents, although probably partially.

The effect of ergot of rye in vesical atony and paralysis, in late years been much lauded. M. Allier, in 1838,² was the first to call attention to the merits of the remedy, since which time it has been tried with great advantage. A very strong tincture³ is by Dr. Day, of London (*Treatise on the Diseases of Advanced Age*) a drachm being given, three times a day, in an effervescing drink of citrate of ammonia. Great care is demanded in its exhibition as disagreeable and even serious symptoms—sometimes a gangrenous tendency—may supervene. On the whole, the remedy, though doubtless potent, is one to which we should be slow to resort. Counter-irritation is often useful. Blisters, either dressed with or sprinkled with strychnine, a measure which certainly demands great caution, are sometimes found to be serviceable. These applications may be repeated, with the exercise of due judgment *re nata*. Cases not presenting very severe symptoms, often respond immediately under this course.

Tartar-emetic ointment is occasionally deemed efficacious in

¹ Conson.

² Journal des Connaissances Médico-Chirurg.

³ Six ounces to one pint of spirit.—Gross.

affection, and is sometimes combined with croton oil. We have previously mentioned that the former is rather discountenanced by reliable authority. The actual cautery is useful in certain very obstinate cases. It is more powerful than the moxa, and with the aid of anæsthetic agents, wholly painless. Dr. Gross uses a button "fully one inch in diameter," and considers this means peculiarly adapted to senile cases, or to that vesical paralysis accompanying paraplegia.

The seton is a questionable method of counter-irritation; sometimes beneficial, it may be superseded by far better and more cleanly means. When irritability of the vesical neck coexists, it might possibly be advantageous.

Mustard-water frictions and plasters, or stimulating embrocations, are occasionally useful. The *emplastrum ammoniaci cum hydrargyro* and that of Burgundy pitch, either alone or with cantharides, are also used as counter-irritants. Cold water, and medicated, vesical injections,¹ with enemata in the passive form, and the cold douche, have often been found effectual. The douche is a particularly powerful local remedy. The water should be turned from a height of three, four, or more feet, upon the hypogastric and sacral regions, for a few minutes, the process to be followed by brisk friction. The latter should also be tried at other times.

Galvanism is spoken of very highly, when the cause of vesical paralysis lies in spinal difficulty; and notwithstanding the discouraging aspect of such cases, the measure is certainly a very plausible one; but it should not be persevered in too long at one time. A few minutes' trial several times in the day,² is better than a long time and only one application. It may be simultaneously applied at different points, or at single ones at a time. The sacral, hypogastric, middle-spinal and perinæal regions are the principal localities indicated.

V. HYSTERICAL AFFECTIONS OF THE BLADDER.

We have already particularly referred to the influence of *hysteria*. A few remarks upon the nature of Affections of the Bladder *referri-*

¹ Strychnine, veratria and cantharides are thus used.

² Gross says eight to fifteen minutes, twice a day.

ble to that *malady*, together with their general treatment and the probabilities of their cure, will suffice.

The important distinction to be made in this class of cases is a *diagnostic* one. We are to determine when there is, and when there is not, disease in the urinary organs. Whilst this is the first and most difficult question, the next—What is the best remedial course?—is hardly less perplexing.

It should be remembered that females most prone to hysterical manifestations, are precisely those most sensitive under actual morbid influences—even if slight in themselves—so that to mistake would be disastrous. Moreover, if hysterical patients, by a wrongly awakened sympathy, are allowed to continue and increase their deceptions, genuine disease may finally be induced, and it undoubtedly often leads to an incurable condition. In no affections, therefore, is it more essential fully to understand the nature of the morbid phenomena, and whether they have a local cause, or are excited by mental derangement alone. By *mental derangement* is here meant, not only that partial insanity which often instigates a series of attempts to deceive as to the presence of illness, but that perverted moral, and, by consequence, physical condition, producing prurient desires and leading its victims into all sorts of imaginations, extravagancies and indecencies. To say that this state is never referrible solely to physical causes, would be untrue—doubtless it often is—but there is every reason to believe that mental and moral obliquities are the most common agencies in the bodily manifestations. Much is attributable to age and education, particularly in respect to association with persons and things, and a vast deal to deficient or erroneous moral and physical training.

That an exaltation of the erotic propensities—an unusual share of them—their non-gratification, legitimately—and the partial satisfaction derived from medical and surgical manipulations, are very frequently the stimuli to deception, aside from actual hysteria, cannot be doubted. This is the grosser aspect, unfortunately too often exhibited—there are more refined phases. An absorbing desire for attention, and of being an object of constant care; a gradually growing selfishness, fed, too often, by anxious friends and mistaken or foiled medical attendants, take possession of the patient. Sometimes she herself becomes deceived—the over-wrought imagination finally fixes itself upon the idea of positive illness as the great fact of life; other ailments, possibly those at first simulated, are actually in-

duced. The evil results of instituting a hasty or an erroneous treatment in these cases, are many. Not the least is the fostering of the deception, and the continuance, thereby, of that low cunning which is continually on the alert to devise plausible means of securing medical interference. As has been very sensibly remarked, the explanation of the *motives* of such patients is "a question of morals rather than of medicine."¹

Doubtless most practitioners recall cases where the female instinct above referred to, has been the only thing to which the sometimes anomalous symptoms they encounter could reasonably be ascribed. Dr. Prout very decidedly affirms, "all the worst cases of hysteric aberration that have fallen under my notice, have appeared to be fairly referrible to an exalted or modified condition" of this very feeling.²

Whilst in the majority of cases like these we have a melancholy view of human nature, the condition claims our sincerest pity and best efforts at cure. To "minister to a mind diseased" is a more difficult task than the healing of physical ills—and although constrained to meet acuteness and deception with the keenest scrutiny and the utmost decision, we are not to forget that true kindness is gentle while it is firm.

Our *treatment* is, therefore, twofold. *First*, we satisfy ourselves, by a thorough physical examination of all the organs apparently concerned in the production of the morbid state, whether the difficulty is bodily and tangible. Remembering that a comparatively slight cause may arouse the disordered manifestations, and that there is often in hysteria this mixed condition, this first step is imperatively necessary. *Next*, if the general health be impaired, we at once attempt its restoration—and all habits tending to disturb it must be abandoned.

If the case prove obstinate, the medical attendant should refuse to indulge false wishes on the part of the patient, yet he must never neglect the least *needful* intervention. The more accomplished the diagnostician, the better his therapeutics, and the safer his patient—this is a truism that particularly well bears repetition here.

The general rule (and it is one of kindness too) "is to interfere but little." We refrain from using the catheter whenever we can,

¹ Prout.

² He adds, that in certain instances, these patients are "perhaps tinctured by remote shades of insanity."

yet are careful not to permit the hysterical woman to injure the contractile power of the bladder by voluntary retention of her urine. Nor must other urgent symptoms be neglected, merely because they occur in hysterical patients, or in malingerers.

The means commonly found effectual in mimetic states, will, of course, be often demanded. The condition of the digestive and uterine functions will call for close attention, and the use of purgatives, tonics, and antispasmodics,¹ either singly or combined, will be suggested, whilst all possible judicious efforts should be made to change the current of vitiated thought, and break up deleterious physical habits.²

VI. WOUNDS OF THE BLADDER.

The pathological conditions resulting, either from violence inflicted from without, or by instruments within the bladder, or by such as are obstetrically employed—or by lesion from calculi, pessaries, and other foreign bodies—although they do not constitute a class of “diseases,” properly so called, yet claim our notice.

Many states following wounds of the organ itself, or in its immediate vicinity, have already been examined, and, in some instances, at length. Such are cystitis, pericystitis, peritonitis, and gangrene; vesical fistulæ, passing into various related organs, are yet to be treated of. The explanation of calculous symptoms after gunshot wounds in the vesical region, would be that a ball or some portion of the clothing had formed a nucleus for stone.

Rupture of the bladder, by the passage of a carriage-wheel over the hypogastrium, or by kicks, blows, etc., is an irreparable injury; the urine being instantly more or less freely extravasated into the abdominal cavity, peritonitis and death are generally very rapidly induced. The accident is infrequent in children and females. In the latter, because the bladder, when full, occupies less of the more

¹ In a case of retention of urine, continuing for seventeen months, and dependent upon an hysterical and debilitated condition, M. Becquerel obtained a cure by cold baths and electricity united. Tonics were also given. The account, which is very interesting, may be found, at length, in the *Gazette des Hôpitaux* for August 11th, 1857. The patient was a female of 23 years, of excellent constitution.

² Much valuable information upon hysteric and irritable vesical disorder may be found in the admirable Croonian Lectures for 1857, by G. O. Rees, M. D. (*Vide Lancet*.)

spacious pelvis, and they are also somewhat less exposed to the causes of the injury.

The *morbid appearances* correspond to the extent of the injury, and the violence with which it is inflicted. Thus, every stage of inflammation, deposition of lymph, softening and gangrene, are found. Lacerations, produced by blows, or concussions from heavy falls, are nearly always seated in that portion of the bladder covered by serous membrane. This is accounted for by the tenseness of the part, and its less elastic, or yielding, nature; it cracks beneath the shock, whilst the rest of the organ distends, and bears it.¹

Prognosis.—Provided the peritoneum be not injured, and the wound be clean, and incised, or punctured—as by a trocar over the umbilicus—there is not excessive danger.² There are many instances on record of recovery after gunshot wounds of the bladder and rectum. To this fact Baron Larrey testified, saying that wounds of the former generally do well.

Life is prolonged, after extensive rupture of the bladder, for some days; and recoveries, even, are recorded. On the whole, we must regard any extensive solution of continuity by violence, and all clumsy surgical bruising of the bladder, as of very bad augury; whilst slight wounds, and especially those not involving the peritoneum, do not generally induce symptoms of alarming nature.

The late Mr. Guthrie remarks (*Commentaries on the Surgery of the War in Portugal, Spain, France, etc. etc.*, edition of 1855, London) that persons do recover from wounds of the bladder, when received below the part covered by peritoneum, “and by what may be considered the most unaided efforts of Nature.” If urine be extravasated into the abdominal cavity, recovery is rare. The fatal results of cases not strictly watched, are, he adds, chiefly by the last-named accident, and by inflammation. Great irritability of the bladder is often excited, and the constitution undermined.

An interesting case of gunshot wound of the bladder, followed by recovery, is related by Dr. Robert H. Grinstead, in the *St. Louis Medical and Surgical Journal*, November, 1857. The facts are given

¹ Dr. Harrison, *Dublin Journal Med. Science*, vol. xi., quoted by Coulson. (*Op. &c.*)

² Authorities differ somewhat; some pronounce incised and punctured wounds more dangerous than many of another nature. Dr. Gross believes them nearly always fatal, and quotes Hippocrates—“*Cui persecta vesica, lethale.*”

in the *American Journal of the Medical Sciences*, for January, 1858, at the two hundred and ninety-fifth page. The subject of the injury was a delicate lad of seventeen years. He was accidentally shot with a pistol-ball, on the morning of the 4th of July, 1857. The ball entered the abdomen in the hypogastric region, "a few lines to the left of the median line, and about half an inch above the symphysis pubis, passed through the bladder, downward and outward through the great sacro-ischiatic notch, and was extracted from a point upon a line with the extremity of the coccyx, and about two inches above the anus."

The bladder was known to be distended at the time of the accident, and the boy was only about five paces off from the gentleman who held the pistol; they were facing each other, the boy being seated on the ground.

"When seen by Dr. G., seven hours after the accident, he was suffering intense pain, and the urine was escaping profusely through the anterior wound. By appropriate treatment, the wound closed in a little over two weeks, and by the eighteenth day he passed his urine by the urethra easily and naturally, and was discharged as not requiring further treatment."

Treatment.—This varies somewhat, according to the circumstances of individual cases. Severe injuries, and such as involve the peritoneum, admit of only palliative measures. The success which sometimes attends the skilful management of gunshot wounds, allows much hope in that department. A great deal depends upon the patient's constitution; if sound and vigorous, with due surgical skill, an *uncomplicated* wound of this description is far from being desperate. Very extensive injury of the integuments, and jamming of the pelvic bones, materially change the case for the worse.

Chelius relates an instance of recovery from gunshot wound of both bladder and rectum, where the prognosis was, to the last degree, unfavourable. There was gangrene of the wound, and a horribly foetid discharge, with passage of urine and feces through the accidental opening, and none through the urethra and rectum. The treatment seems to have been wholly directed to the constitutional state. The only local means mentioned, are hot poultices. Bark, ammonia, camphor, brandy and bottled porter (the latter found very serviceable), were required to sustain the strength. Healing and restoration of the parts followed, without other medication, and a resulting urethral stricture was cured by Sir Astley Cooper.

Mr. Coulson does not agree with Chelius as to the mode of getting rid of the urine in cases of wounded bladder, when the solution of continuity is at the upper part of the organ. He prefers, very judiciously, to retain a catheter in the bladder, rather than to lead off the water through the lips of the wound, by means of "a piece of partially unravelled linen."

The lateral operation for lithotomy was successfully performed in a bad case of ruptured bladder, by Dr. W. J. Walker, of Boston, Mass. The patient recovered well.¹ This practice not only afforded free egress to the urine, but prevented the accident of extravasation into the tissues about the injured organ, and merits the approbation it has received from distinguished surgeons. To insure success, the operation should be done as soon as is practicable.

The following "Conclusions," from the work of Mr. Guthrie, lately cited, are valuable by reason of his large experience, and their condensed form allows of their quotation.

1. "In a wound of the bladder, an elastic gum catheter should be kept in it, frequently without a stopper, until the wound is presumed to be healed—unless its presence should prove injurious from excess of irritation, not removed by allowing the urine to pass through it by drops, as it is brought into the bladder." 2. "It is essential to the preservation of life," that an opening be made from the perinæum into the bladder, when the back part of the urethra, or the neck of the bladder, is injured. 3. Treatment must be eminently antiphlogistic; general and local bleeding—absolute rest—abstinence from food, and, in some cases, even from drink—frequent administration of enemata—early exhibition of mercury, and especially of opium²—are essential.

VII. VESICAL FISTULÆ.

The closure of *vesico-vaginal fistula* has of late years received much attention, and elicited unwearied perseverance from many distinguished surgeons. Formerly, the difficulty of obtaining closure of an opening against which urine constantly presses, and

¹ Notwithstanding fracture of the pelvic bones. The case is reported in the *Communications of the Massachusetts Medical Society*, vol. vii., 1845.

² By the mouth, or in the form of suppositories, or enemata; if suppositories be used, begin with one containing two grains.

through which it tends continually to pass, deterred operators from any but palliative measures. Sponges and bottles, to collect the urine, were at first the only resort. Ligature was suggested by Mr. Preston, an English surgeon, and was successfully tried by Mr. Leeke, Mr. Gosset, the late Mr. H. Earle, and others. Additional cures by this method are related. The actual cautery was at one time much in vogue; it had the approval of Dupuytren, when the aperture was small. Dr. Kennedy of Dublin, Delpech and Velpeau also report in its favour; and it has quite lately been used with success by Nélaton in an instance where an aperture three-quarters of an inch in extent was in question. The galvanic cautery has been suggested as worthy of trial, instead of sutures.¹

Fully to detail the progress of improvement in remedying these annoying accidents, would occupy too much space. It is enough to state that the most approved operation consists in revivifying the edges of the fistula and uniting them by means of a modification of the quilled suture termed the "*clamp-suture*." Two small clamps, or bars of silver, or of lead, are drawn closely, one against each side of the opening, by very delicate, annealed silver wire, which is fastened by *shot*, acting like knots. Thus, more support is given towards the union—for when simple sutures are used, the occurrence of any sudden shock, or muscular effort and downward pressure of the abdominal viscera, is likely to tear them out, and frustrate the whole process. This has often happened from coughing or sneezing, only. Besides the methods and cases detailed by Coulson, Gross and others, we would refer to the very fair success of Dr. George Hayward, Sen., of Boston, who operated in every one of his cases by ligature, and has published a most valuable paper upon the subject in his volume entitled *Surgical Reports and Miscellaneous Papers*, Boston, 1855. Dr. Hayward notices the method of Dr. J. Marion Sims at some length; the clamp-suture (Sims) he thinks open to the objection of removal of the sutures in from six to ten days, as being liable to disturb the adhesive process, which his own mode of procedure avoids, by allowing them to remain until "thrown off by ulceration."² Dr. Sims, now resident in New York

¹ M. Debout, editor of the *Bulletin de Thérapeutique*; who refers especially to Dupuytren. See *London Lancet*, Jan. 23, 1858.

² Dr. Sims pays but a very limited compliment to Dr. Hayward, when he says that the first successful operation in this country was by him. His account of the operation, and his cases, deserve the closest attention.

City, has had large experience and much success in operating. Drs. Mettauer and Pancoast have also been fortunate in their cases and most skilful in their manipulation.¹

With the aid of *anæsthetics*, much is now accomplished which formerly was deemed impossible, and in no cases could they be of more essential service than in these.

It has been asserted that spontaneous closure sometimes occurs in cases where care is taken to draw off the water and to retain a catheter in the bladder. This result must be exceedingly rare. Surgeons of very large experience have met with no such instance. Mr. Coulson, alluding to one by Mr. Gaitskell, advises the most immediate surgical attention possible, when the case admits of relief—as in simple fissure. Thus the parts do not become hard, less paring is needed, and, if successful, the patient is saved much suffering. The *elytro-plastic* operation, originating with Velpeau, but first done by Jobert, is analogous to others where the object is to transplant healthy tissue to the morbidly open part. Its success has not been encouraging. Jobert cured two patients out of four; one by a second operation; one died; one was unrelieved.

The bold procedure of opening the abdomen through the *linea alba*, and sponging out the urine—instantly extravasated from a bladder wounded through the peritoneum—is considered justifiable by Dr. Gross. He remarks that these cases inevitably terminate fatally; a fact universally allowed. We can hardly expect, then, to cure such a patient; and it is a question whether we should complicate the case still further by so serious an operation, whose success is a “forlorn hope,” and in reference to which Dr. Gross himself says that “the only difficulty in the case might be the uncertainty of the abdominal effusion.”

Whilst we think there are other “difficulties,” yet we might be tempted to do the operation, rather than be an idle witness of inevitable peritonitis which must prove fatal. There could, however, be hardly one chance in a million of saving the patient. Most surgeons, we think, would decline to use the knife on the ground of the double doubt suggested.

There may be fistulous communication between the bladder and

¹ Dr. N. Bozeman, of Alabama, has published an account in the *Louisville Review* (No. I.), of a new method called by him the “button-suture.” It promises very highly. See Appendix, Note W.

rectum, or other intestines, the uterus and the urethra. These are infrequent accidents compared with vesico-vaginal fistula. The different fistulæ are sometimes congenital as well as accidental; of course the latter class of cases greatly predominate. Instances of compound fistulæ are recorded; as vesico-utero-vaginal (Jobert); vesico-vagino-rectal (Gross); there are very few examples of vesico-urachal and vesico-peritoneal.

An interesting case of communication between the rectum and bladder, from ulceration, after a wound of the former, is quoted in the *Edinburgh Medical Journal* for November, 1857, from the *British Medical Journal*, August, 1857. The rectum was wounded by the patient's sitting down, "rather suddenly, while undressed at night, on the sharp, broken end of the upright part of an arm-chair." Death occurred about one month from the time of the accident; incessant diarrhœa, even to the extent of twenty or thirty evacuations daily, having followed the patient. Air had escaped from the urethra.

"On *post-mortem* examination, thirty-four hours after death, the body was found decomposing rapidly, and the scrotum distended with gas. There was secondary abscess in the lower lobe of each lung. The apex of the upper lobe of the right lung contained a few tubercles, some of them calcified. Immediately behind the trigone of the bladder was an aperture large enough to admit the finger, opening by a small orifice into the rectum, on its interior wall, about two inches from the anus, and just behind the part which is in relation with the prostate. There was suppuration in the sub-peritoneal cellular tissue, and in the lumbar glands on the right side. The common iliac and internal iliac veins on the left side contained blood mixed with a good deal of pus." The wound is stated to have appeared much larger on the vesical side, on account of the extension of the ulceration; "while, in the spot originally lacerated, it was so small as to elude digital examination."

As the man was apparently unaware that the wood had entered the rectum, much obscurity veiled the symptoms, as to their cause. The rarity of the accident, and the great probability that fistulous communication between the injured organs would have remained, had the patient recovered, induce us to refer to it in this connection.

In an instance of urethro-rectal fistula, following abscess between the two passages, in a man 22 years old, Mr. Erichsen laid open all the false passages in the perinæum into one, on the 12th of August, 1857, and paid strict attention to the general health, which had been

bad, the "whole system being below par." The man had had simple abscess in the right groin, and also upon the trunk and one hand; there seemed a great lack of vital energy. The treatment answered well; some urine was passed by the perinæal wound, but the irritability was less. No spasm was observed after the division of the *sphincter ani*, when all the passages were laid open. "A good-sized catheter could be passed into the bladder, on overcoming some spasmodic closure of the membranous portion of the urethra." There was thus a fair prospect of a cure. (*London Lancet*.)

Fistulous passages may also pass to the exterior of the body, in the abdominal, crural or perinæal regions; there is usually but one, occasionally two or more, even in the same individual.

Ingenious methods of closing the various fistulæ just named are recorded by many writers. Jobert's treatise upon them (Paris, 1852) may be consulted with advantage.

To give a detailed account of the various operations devised, and more or less successfully executed, hardly devolves upon us here.

Measures analogous to those adopted for remedying vesico-vaginal fistula are put in requisition for those in other situations, when it is possible to reach them. Recto-vesical fistula will often close spontaneously, if great care be taken to keep the intestine free, and extreme cleanliness be observed.¹

¹ *Vesico-Intestinal Fistula*.—A remarkable instance of this accident was observed by MM. Piorry and Neaudot (of *Boulogne sur Mer*), and is reported in the *Gazette des Hôpitaux*, for July 18, 1857. The patient, a female of fifty-four years, of medium constitution, never having had children, was affected with umbilical hernia, and subsequently with peritonitic symptoms, referred to gangrenous action in a strangulated portion of the intestine. The explanation given is, that when the eschar fell off, the bowel was perforated, and peritonitis being set up, blocked the aperture and saved the patient's life. The contact of pus and of other matters with the neighbouring portion of the bladder is supposed to have excoriated it, and finally a fistulous communication was established. False membrane was effused around the fistulous track, and caused dull percussion over the corresponding part of the abdomen. Gas escaped *per urethram*, but no urine issued from the anus.

Although it was believed that art could not remedy this condition, slight pressure was advised by M. Piorry over the affected spot, where a tumour was detectible; and irrigation of the bladder, by Cloquet's *sonde à double courant*, was also employed, it being feared that portions of matter from the intestine might enter the bladder, and prove nuclei for calculeous concretions.

The reporter of the case (M. Felix Bandonin, *Elève des Hôpitaux*) concludes by saying: "I believe no similar case stands recorded. Such a termination of an intestinal perforation is most fortunate; and the present state of the patient is

The importance of preparatory measures, before doing any of these operations, is rightly insisted upon by surgeons. The recumbent posture, cold lotions to the vagina, its careful cleansing, and maintenance of the solubility of the bowels, are essential. Simple diet, soothing drinks, and abstraction of blood from plethoric patients, are advised as greatly contributing to success.

VIII. DISEASES BY DISPLACEMENT.

A. CYSTOCELE.

Etiology.—The causes of hernia of the bladder are certainly not very evident. It is an affection particularly attaching to old age, although it has been observed in quite young subjects. It is more frequent in males than in females.¹ It has been caused by violence, and also during labour; the distended bladder has been propelled before the foetal head, and actually punctured, under the impression that hydrocephalus existed (Merriman); and the same thing was done at another time, the tumour being mistaken for the bag of the ovum. (Hamilton.)

Mr. Coulson believes that some peculiarity, either congenital or acquired, of the bladder itself, or of the disposition of the abdominal walls, must exist, causative of the approach of the viscus to the outlet it occupies. The accident is universally allowed to be uncommon. The displacement is either into the inguinal, crural, perineal, or vaginal regions, the first being the most common.

In pregnancy, we may have the bladder displaced directly downwards, the tumour appearing in the perinaeum or vagina.

The instances of displacement into the vagina are not infrequent. We lately observed a case of this nature in a middle-aged widow-woman who had probably been injured by lifting great weights. Similar influences doubtless often induce cystocele in various situations. Violent straining at stool may possibly cause the accident. Dropsical effusion has sometimes produced it.

Morbid Changes Induced.—When the bladder passes through any aperture which is comparatively small, as the inguinal ring, it is

quite supportable, since the emission of urine and of faecal matter is under the control of the will."

¹ Laugier. Coulson.

liable to become girt at the ring, and to expand beyond the structure. Thus a double pouch will be formed. Sometimes the lower portion becomes enormously distended: calculi are often found in the herniated sac.

It has been remarked that, as a cystocele may give rise to a protrusion of the omentum, so an enterocele or epiplocele may cause a descent of the bladder. The latter sometimes passes into the scrotum, so that it is mainly contained therein. Adhesions are occasionally formed to the posterior surface of the abdominal muscles. The peritoneal investment in these cases is generally in part that belonging to the bladder itself, and intestine or omentum may come down, with the herniated sac adherent "to the surrounding parts by cellular tissue."¹ Dr. Gross remarks that no proper peritoneal sac can attach to cystic hernia: for the bladder, being, when *in situ*, only partially covered by serous membrane, must, when it leaves the abdomen, lie externally to that membrane.

If the hernia be very ancient, or exceedingly large, the *fundus vesicæ* "may drag the peritoneum down into the scrotum," thus forming a genuine hernial sac. The upper part of the organ usually constitutes the main swelling, which is generally small, but has been known to be as large as the fist, or a goose-egg. Inguinal cystocele may be double.² Occasionally, very extensive, and even total, hernia occurs—an enormous tumour resulting. The penis may then appear wholly buried in the integuments, and the urine seem to be discharged by an opening looking like the navel.³ The intestine, or the omentum, usually descends, in such cases, with the bladder. Inflammation and softening sometimes happen; the latter condition being proved by the easy laceration of the vesical coats, in particular spots, as observed *post-mortem*.

The urine which collects in the prolapsed portion, provided there be not actual strangulation of the latter, is generally fetid and ammoniacal, and sooner or later causes much mischief. It is observed that, in order to the production of cystocele, the bladder "should be placed immediately behind, or very close to the ring, and that it should hold that situation when empty" (Coulson); for, when full, it certainly is not in a condition to become herniated.

Verdier says that pregnant women are apt to have cystocele, be-

¹ Coulson.

² Delaporto. Laugier.

³ See Mr. Clement's case, reported by Gross, *op. cit.*, p. 405.

cause, by the pressure of the uterus, as it developes, the form of the bladder is changed; it is extended laterally, and finally escapes through the inguinal rings. Laugier makes a similar remark, and ascribes much influence, in producing the accident, to flaccidity from long distension.

Double bladder,¹ as it has been called—or more properly separation of the viscus into two portions, either by a morbid growth springing from the inner membrane, and dividing the bladder, or by the temporary spasmodic action of the transverse muscular fibres in one spot—is spoken of by several authors.²

Treatment.—When inguinal or crural, and no adhesions exist, a truss should be applied, to keep up the tumour. In case adhesions have formed, it can only be suspended by a proper bandage. As it is very important to evacuate all the urine contained in the protruded portion, this may generally be done by lifting it, and making pressure from its lower part upwards. Calculi in the herniated part should be removed by incision. Operators have done this without any ill result; and the procedure is generally recognized.³

In excessive protrusion of the vesical tumour into the vagina, the use of a sponge, or of the pessary, is demanded; at any rate, temporarily. At the earliest intimation of the affection, the bladder should be kept empty, and all straining at stool, or by lifting heavy weights, forbidden, as this would greatly hasten the mischief. Astringent and tonic lotions are also of service, and the recumbent posture, with the loins somewhat elevated, should be enjoined. After delivery, such patients should maintain this position long enough to insure a good degree of restoration of the vagina to its usual tone and calibre.

Malgaigne and others advise a supporting bandage to the hypogastric region, much the same as in certain cases of displaced uterus; and the prevention of the small intestines from pressing down the uterus and bladder, is often thus secured. The proper method of obtaining reduction of the vesical hernia, or at least of getting rid of the tumour formed, when the bladder is distended and pushed before the foetal head in its descent, is to draw off the water, if possible.

For this purpose, a male catheter is required, its point being turned “downwards, towards the base of the tumour.”⁴

¹ *Vide* p. 285.

³ S. Cooper; Pott; Coulson; Gross, *et al.*

² Baillie; Coulson, *et al.*

⁴ Gross.

The female catheter will not answer in such a case, being too straight. The instrument must be used during an interval of the pains, and the patient must lie on her back. If catheterism be not possible, pressure skilfully made against the tumour, raising it towards and behind the pubis in the interval of the parturient efforts, and retaining it there till their recurrence, will generally succeed; the uterus will take care of the rest.

In Robert's case of cystocele during parturition, reported by Verdier, the tumour in the vagina was overcome with much difficulty by the catheter; it was necessary to press upon it, in order to make the urine flow, but, this accomplished, the cystocele disappeared and the labour went on well.

Strangulation of vesical hernia, recognized by many surgeons,¹ though doubtfully admitted by Coulson, is relieved either by puncturing the tumour with a trocar (Morand), and drawing off the water, or by cutting down, as in intestinal hernia, and freeing the stricture. Laugier hints at doing, *voluntarily*, what Mr. Pott did by mistake,² in old and large cystocele, where the walls of the tumour are very thin; viz., to remove the lower portion and treat the wound as if for ruptured bladder, by the assiduous use of the catheter.

If enterocele be complicated with cystocele, the operation would be the same, care being taken not to injure the internal and posterior portion of the peritoneal sac, immediately under which the bladder lies.³

The species of hernia entitled *poche vesicale* by the French, is probably never clearly diagnosticated, so that nothing remedial would be suggested, even were it possible. When intestine enters a vesical pouch formed by the introduction of a portion of peritoneum through the muscular fibres of the bladder, the peritoneal covering forms the inner surface, and the vesical mucous membrane being pushed before it, is the outside tunic; the loop of intestine contained in such a pouch may readily become strangulated. The symptoms would be mainly those usual in incarcerated intestine. An operation might prove effectual, but would be difficult and doubtful.

The other, more common variety of vesical pouch is constituted

¹ Morand; J. L. Petit; Laugier, *et al.*

² In a boy of 13 years.

³ Laugier, *Dict. de Méd.*

by the crowding of a portion of the mucous membrane between the muscular fibres.¹ Owing nearly always to great pressure by the urine—obstructed in its flow either from contraction, valvular closure (Amussat), or other morbid growth of the vesical neck, or by stricture of the urethra—this is probably a frequent origin of the double or the multilobed bladders found *post-mortem*, in addition to the more ordinary hernia. Laugier saw three such pouches in one bladder, of sizes from that of a nut to that of a pippin—with calculi in each. Sometimes no calculi are contained in them.

Nothing could more unfortunately complicate a case of vesical calculus where lithotripsy is tried, than these receptacles. Certain fragments would be nearly sure to lodge in them and renew the formation. By long retention of urine they might burst and fatal extravasation ensue. No more likely than the former class of pouches to be recognized during life, they are equally beyond the surgeon's aid.

B. INVERSION OF THE BLADDER, WITH PRESENTATION OF A PORTION AT THE URETHRAL ORIFICE.

This is alone observed in the female—if the case reported by Dr. Bamberger be excepted²—and is possible only by reason of the shortness, dilatability, and straightness of her urethra. The inducing causes must be a certain relaxation of the mucous membrane—natural or abnormal—and a dilated state of the urethra. The immediate effective influence is violent straining, such as often takes place in defecation, in those greatly constipated; or in attempts at urinating where there is stoppage of the flow from stricture or other obstructions. The prolapse is either partial or complete; that is, all the tunics are extruded, or only the mucous coat. Chopart treats of it, but at no length. Rokitansky mentions its occurrence. Dr. Gross has given more of an account of it than any author within our knowledge.

The first case on record, according to him, is that of M. Noel, of Orleans, early in the last century. The subject of the accident was a little girl, who, for several days, had had retention of urine with convulsions. A tumour, of the size of a pullet's egg, was seen to hang from the urethra in the form of a very thin, transparent bag, filled with "a clear limpid fluid," and at the *post-mortem* examina-

¹ See Fig. 14, page 109, Part I.

² See Gross, *op. cit.*, p. 411.

tion, a few hours afterwards, this was ascertained to be a pouch filled with urine—and which, by reason of some obstruction to the issue of that fluid, had been driven down; the contents of the bladder had been so long retained, that the ureters were greatly enlarged, and the pressure had been so exercised upon the vesical coats as to separate the mucous from the muscular, and finally to throw the former out of the urethra.

Very few instances (only three well authenticated ones, according to Dr. Gross) of complete inversion and prolapsus of all the tunics are recorded. These are, one related by Chopart in his *Treatise on the Diseases of the Urinary Organs* (Paris, 1830); the practitioner to whom it occurred was M. Percy. Dr. Murphy, of Dublin, and Mr. Crosse, of London, met with the other two. The cases may be found reported, with comments, in Dr. Gross's volume. A careful diagnosis is indispensable, lest, as had nearly happened in one of the above instances, a ligature be applied, by mistake, to remove a tumour of supposed vascular nature, a procedure which would certainly be fatal.

Treatment.—Reduction is to be effected by the *taxis*; the part last protruded being first returned, as in the familiar methods for intestinal hernia and prolapse of the rectum. If the accident is of some standing, and any inflammation, thickening, etc., have been induced, rest in the recumbent posture, and means for diminishing the local congestion—as leeches, fomentations, purging, etc.—should be used before attempting to restore the part to its place. This is especially demanded in old cases, where there has been much friction, or when a tendency towards strangulation is manifested. In reducing the herniated portion, the proper position for the patient is that assumed during the replacement of enterocele; i. e., supine, the head and shoulders raised, the thighs bent upon the pelvis and widely separated. In cases of long continuance, and where the protrusion is large, it may be requisite to use a gum-elastic catheter, and, steadying the neck of the bladder with the thumb and forefinger of the left hand, push up the fundus with the end of the catheter.¹

The recumbent position should be maintained for a long time

¹ Dr. Murphy's case, quoted by Gross. Anæsthesia is a valuable aid, as in reducing intestinal hernia.

after the hernia is reduced—and the frequent use of the catheter will be daily required.

Dr. Gross suggests the application of a T bandage, with a pad resting on the urethral orifice, if the tendency to protrusion be very decided—also, that an abdominal truss be worn when the patient rises from bed.

To prevent recurrence, the radical operation for narrowing the urethra may be performed; removing a small portion of its inferior mucous surface, and uniting the wound by the interrupted suture. The urine must be drawn off by the catheter several times daily, until the part is perfectly healed.

IX. SUPPRESSION, RETENTION, AND INCONTINENCE OF URINE.

In the first of these states (*ischuria renalis*), the renal function is suspended, or totally abolished; in the second (*ischuria vesicalis*), whilst the kidney may be healthy, and secrete the urine normally, the bladder does not, and *cannot*, unassisted, expel it. Incontinence of urine is the constant flow of it, as furnished, from loss of control over the vesical neck. There is an incontinence resulting from long retention, very liable to be mistaken for that arising from feebleness or irritability of the bladder.¹ The use of the catheter generally resolves our doubts, and should be our first procedure.

A. SUPPRESSION OF URINE.

This may be partial or entire; generally there is clear evidence of its causes. Dr. Prout states that he never met with any instances, such as are reported, of sudden suppression in persons "*apparently in perfect health.*" He believes that there is always some local or constitutional cause for the affection, and describes it under three different categories, viz, the "*inflammatory, spasmodic, and mechanical.*" Renal disease of a serious nature (as fatty degeneration) thus becomes causative, and usually the intensity of the symptoms soon declares the source of the difficulty. The spasmodic form is apt to be manifested in gouty and hysterical subjects—and mechanical obstruction, as that from calculus, stricture, or enlarged prostate, occasions the symptom. In the latter class of cases, the frequently

¹ See above, p. 346.

co-existing inflammation and spasm may be credited with a large share of the productive influence.

Long-continued intemperance, with commencing renal disease resulting from it, is, not infrequently, a cause. It is not improbable that many extraordinary cases of reputed complete suppression, are such as have been from time to time relieved by a very slight flow—even this would prove sufficient for a while. In hysterical patients, there are many instances of pertinacious feigning which may sometimes deceive even a wary practitioner. Dr. Prout distrusts many of the reported cases of recovery¹ in adults—especially when females—and on one or other of the two last-named grounds. There is reason to believe that the urine sometimes passes off, by other than the usual channels—owing to malformation either of the ureters or bladder. It may flow into the rectum.

Most frequent in extreme youth and in very advanced age, the instances in middle life are mainly referrible to renal disease and to hysteria. The troubles of dentition seem to produce it—at all events, it is often coincident with that process. Sudden and long exposure to severe cold is the most usual exciting cause in those predisposed. In an instance reported by Dr. G. Johnson (*op. cit.*), a temperate man, after two or three wineglassfuls of brandy and water, at night, had a fatal attack. Extensive renal disease was found on *post-mortem* examination.

Prognosis.—When true and complete suppression occurs, there is no chance for the patient. Even partial suppression is grave.

In the genuine cases, coma, resulting from uræmia, must prove fatal. In hysterical cases, the suppression in a majority of instances is, so to speak, not actual—at least, often not persistent. Thus, such patients, in the exercise of their marvellous, and often disgusting cunning, will pass and *swallow* their urine, to keep up the deception—a melancholy fact, dwelt upon by Dr. Prout and many others. There is no immediate *local* danger in such cases; that the morbid mental state may grow more and more serious, is greatly to be feared.

Treatment.—This is addressed, specially, to removing the *cause*. Renal disease, with ischuria as one of its symptoms, will direct our measures according to its own nature. Spasm must be met by the usual antagonistic means. In retrocession of gout we seek to restore

¹ i. e. He believes there was *no suppression*.

that affection to its forsaken seat—by the procedures previously mentioned (p. 341). In chronic cases, diuretics and tonics are advised—and also when the complaint is only partial. Any mechanical cause, as calculus, even if only remotely connected—much more if directly causative—must be removed; and the greatest care is required to subdue, and prevent the recurrence of inflammation. Any indications furnished in particular instances by concomitant morbid states (and even if such be only strongly surmised) should be followed by the physician.

B. RETENTION OF URINE.

This condition has already been referred to in connection with paralyzed states of the bladder. Its causes are usually apparent. In addition to paralysis, there are the various obstructions of the urinary flow—either mechanical or systemic. In the former class, are stricture of the urethra, or at the vesical neck—a foreign body in either situation—as a piece of broken bougie, hardened mucus, organized lymph (Gross), and sometimes an enlarged mucous follicle, forming a tumour—coagulated blood in the bladder, etc. Great thickening of the vesical tunics may produce the difficulty; and so may pressure made by the rectum (abnormally distended by foreign matters impacted in it, or by diseased growths) upon the vesical neck. Abscess of the rectum has caused it.

Amongst constitutional causes, *hysteria* plays a part, and a generally irritable or spasmodic tendency of the individual predisposes to retention. When not interfered with, it may lead to suppression of urine, by its action on the kidneys, and may end in rupture and gangrenous destruction of the bladder. Gout is occasionally esteemed an efficient cause. (Todd.)

A malformation or mal-direction of the female urethra sometimes occasions retention, and requires a dexterous hand at the catheter, which should be “inclined, at first, from above downwards, and then upwards and backwards.”¹

Perineal abscess, or effusion of blood or lymph, by pressure on the urethra, is sometimes a cause; and blows or kicks in this region, even without rupture of the canal, are alike influential.

Dr. Gross mentions cancerous disease of the penis, ascending to the bladder, as likely to induce the same difficulty. Enlarged

¹ Gross.

prostate, the gravid uterus, by its pressure on the vesical neck, and prolapsus or retroversion of the organ also produce retention. Pelvic tumours are another occasional cause, and so is priapism. Imperforate prepuce is likewise followed by it.

Enlarged prostate is pronounced a very frequent cause of retention of urine. In a lecture recently published in an English medical journal, Mr. John Adams, one of the surgeons to the London Hospital, asserts that "a week seldom passes without a case of this description being admitted" into the wards. In treating the condition, he, in common with most surgeons, inclines to use an elastic catheter, of moderate size, "without the stylet, and made straight before its introduction." This, he adds, "will pilot its way gradually between the lobes, and reach the bladder." The elastic catheter is usually not tried, however, until the *prostatic* instrument has failed; but its employment, as Mr. A. intimates, would seem to be very advisable *at first*; for, as he also remarks, "no harm can be done by it, which is more than can be said of the use of the silver instrument." Mr. Adams refers, as do Coulson and others, to Mr. Hey's well-known instructions for passing the prostatic catheter, by tilting its end over the projecting portion of the gland. For descriptions of the mode of using instruments to enter the bladder in cases of enlarged and obstructing prostate, and for figures of the instruments, etc., Mr. Thompson's work, elsewhere referred to, may be consulted.

In those rare instances where the operator is baffled in his attempts to pass any catheter, owing to the extent or form of the prostatic obstruction, Mr. Adams states the method by pushing a catheter through the back of the prostate, and thus obtaining a discharge of urine through a false passage. The choice, in such cases, is between the latter procedure and vesical puncture. Fergusson, Coulson, and others prefer perforation of the prostate, which, however, as Mr. Adams says, "is now and then fatal." Cases of *supra-public puncture* of the bladder, for retention, may also have a fatal termination, the great risk being from infiltration of urine and its consequences; but the instances in which the operation is required, are certainly very rare; and death from it is still more uncommon. Malgaigne refers to Sabatier's statement of an instance where the canula was left in place for a whole year after

¹ An intermittent form, relieved by quinine, has been signalled by Sir R. Brodie.

supra-pubic puncture for the relief of retention caused by a prostatic enlargement, which entirely closed the urethro-vesical orifice; there was not the least untoward occurrence. Mr. Fergusson, whilst he gives prostatic perforation the preference, justifies it only in "extreme cases," and insists upon the care and judgment with which it should be done. The French term this method "puncture by the urethra;" it is, in other words, forced catheterism. Lafaye performed an analogous operation upon the celebrated Astruc, who had retention of urine from a tumour seated at the neck of the bladder. The advantage of a successful prostatic false passage is, that if maintained, "the patient never suffers from any relapse, and considers himself cured permanently."

As Mr. Adams remarks, speaking of *supra-pubic* puncture, the patient, after some days, will urinate voluntarily, the urine having been duly drawn off at first. This indicates some unusual distension of the bloodvessels of the prostate gland, probably congestion of the numerous veins around it, and under the mucous membrane about the neck of the bladder. Mr. Coulson is decidedly in favour of vesical puncture by the *rectum*, when such an operation is inevitable. There are, of course, many cases where the nature of the prostatic enlargement does not permit the employment of this method.

Obstruction from enlarged prostate often occasions that species of retention which has too frequently been mistaken for *incontinence*—from the fact that the surplus urine overflows. In regard to this, Mr. Henry Thompson remarks: "this condition is generally described as incontinence, a misapplication of the term, as we shall hereafter see, which has been productive of fatal errors in practice. A much better term is that employed by the French surgeons, namely, "regorgement" (overflow), and this I shall for the future employ, as aptly indicating a condition which, so far from being one in which the bladder *cannot retain*, is one in which it *retains too much*." (*The Enlarged Prostate*, etc. etc., London, 1853, p. 74.) Mr. Thompson subsequently refers to the well-known accidents known as uræmic, and which arise after embarrassment of the vital functions of the kidneys from attacks of complete retention owing to prostatic enlargement. In his opinion, those instances are wholly exceptional, where an increasing enlargement of the prostate "opens or loosens the neck of the bladder," thus establishing genuine incontinence of urine. Abnormal closure of the urethro-vesical

outlet is the rule in this affection, inducing, of course, unnatural effort at overcoming the obstacle; failure to evacuate all the urine is inevitable, and the above-mentioned symptom is at last produced.

The prolonged disorder often thus established in the urinary apparatus, and the changes in the urine, not infrequently cause the formation of calculus. Prostatic disease sometimes masks the calculous phenomena. The two affections have many symptoms in common, and a stone may escape detection, whilst lying behind an enlarged prostate. Atony of the vesical coats is another state tending to obscure the diagnosis. (Thompson, *op. cit.*, pp. 78, 79.) Obstruction of a mechanical nature is believed to be by far the most frequent cause of chronic retention of urine. As Mr. Thompson and others have suggested, the obstruction may be either at the neck of the bladder (*prostatic*, most commonly; sometimes stricture of the neck), or in the urethra (stricture). "It should be held as an axiom, the importance of which it is impossible to overrate, that AN INVOLUNTARY FLOW OF URINE INDICATES RETENTION, NOT INCONTINENCE." (*Op. cit.*, p. 87.) Such patients, as we have elsewhere (*æ* p. 346) remarked, have been supposed to have "irritable" bladders—which *would hold no urine at all*—whereas they had held until they could hold no more. "Real incontinence," says Mr. Thompson, "is a rare occurrence in the adult male."

The work to which we so fully refer, is replete with information upon the subjects of which it treats, and should find a place in the library of every surgeon, as a companion to the author's treatise upon *Urethral Stricture*.

Prognosis.—Unless immediately relieved, disastrous effects follow. When grossly neglected, death must ensue, and even a less delay induces the most serious difficulties, leading finally to incurable results. Prompt evacuation of the bladder, and the removal of all known causes, with cautionary measures against the harbouring of any predisposing agencies, allow us to augur favourably for such patients.

Treatment.—The first, and a most important step, is to overcome all inflammatory and spasmodic conditions and tendencies. In the latter states, antispasmodics, opiates—internally and by clyster—fomentations, etc., are demanded. The induction of complete *anæsthesia*, by ether or chloroform, will often enable the surgeon to pass a catheter and relieve retention, when otherwise it would be im-

possible, and puncture would probably be resorted to. A marked instance of relief thus obtained, is related in the *Medical Times and Gazette*. The patient was an intemperate cab-driver, who had had retention of urine for two days. He doubtless was affected with a permanent stricture of the urethra, and which was closed by inflammation. Opium had failed; no catheter could be introduced into the bladder. Under anæsthesia, induced by chloroform, a No. 3 catheter passed most readily.

The *Buffalo Medical Journal* for December, 1857, quoting the above case, adds the following similar one observed by Professor Hamilton:—

“George Williams, brakesman, State Line Railroad, was severely injured in a collision, Oct. 8th; on the 9th, Dr. Hamilton was able to introduce a catheter to relieve his bladder, but, on the morning of the 10th, he could not, owing to the swelling in the perinæum, and spasm in the urethra. Repeated and prolonged attempts were made on the 10th and 11th, and on the morning of the 12th. At the suggestion of Dr. Flint, chloroform was administered, until complete anæsthesia was produced, and at the moment of the most extreme prostration, the instrument fell into the bladder by its own weight. He had retained his urine sixty hours.”

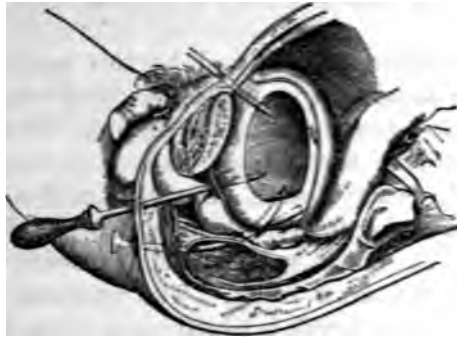
The following statement, in relation to the use of *quinine* in retention, is taken from the *Lancet* of January 23d, 1858:—

“Dr. Serres, of Dax (France), quotes eleven cases of his own practice, where he succeeded in removing dysuria, or conquering retention of urine, by giving disulphate of quinine in doses varying from eight to ten grains every half hour. In retention, urine began to flow after the second or third dose, and no instrument was used in the cases mentioned. It would also appear that the quinine did not produce any unpleasant symptoms. How does the alkaloid act in these instances? Probably by allaying spasm. One case is recorded, where several strictures had existed for a long time, and the quinine was, nevertheless, successfully administered.”

The muriated tincture of iron is often of great service in cases of retention. We need not recur to the well-known means enlisted in opposing inflammatory symptoms in the neighbourhood of the urinary organs. The treatment of the retention of hysteria has already been adverted to. The use of the catheter, in this form, should be as tardy and infrequent, as in other cases it is prompt and sedulous, unless there be special contrary indications.

All the sources of obstruction¹ referred to, require removal, as the circumstances of each case dictate, but if impossible to remove them in season to prevent mischief to the distended bladder, we must puncture the latter, and draw off its contents. This operation

Fig. 27.



The different points for puncture of the bladder.

is rarely necessary. Desault believed it never to be so; but there are cases which abundantly justify it. Rectal, perineal, supra-pubic, and inter-pubic puncture, are the varieties.² The first is the most frequently done, because the easiest, and according to M. Mondière's table, it is less fatal than the others,³ although death at any rate is rare, when the operation is properly performed; at all events, the procedure itself is very infrequently causative.

C. INCONTINENCE OF URINE.

We recur again to this subject in view of certain etiological and therapeutical points, not previously enlarged upon.

Witnessed at every period of life, it is perhaps most common in the very young, and in the paralytic or enfeebled states of old age. In children, it is occasionally very troublesome. Many cases are seemingly not amenable to treatment, at least for a long time. Sometimes referrible, as we have seen, to an irritable condition

¹ In retention from enlargement of the prostate, particularly, Mr. Druitt recommends cupping upon the perinæum, and the hot hip-bath, provided there are inflammatory symptoms. The methods of catheterism most in favour have already been mentioned, when speaking of enlarged prostate as a cause of retention.

² For details of the methods of operating, see Mr. Druitt's *Vade Mecum*, and the work of Dr. Gross.

³ *Revue Médicale*, April, 1841, quoted by Dr. Gross.

of the bladder, the influence of habit prolongs the affection indefinitely. The incontinence resulting from retention is a most important form.¹ Failure in diagnosing it would probably be fatal—certainly very disastrous—to the patient. When the resistance of the vesical sphincter is overcome by continual distension, a dribbling of urine is readily mistaken for incontinence otherwise produced.

Lithotomy is sometimes followed by this symptom; usually, however, in the female only. Injuries to the parts, otherwise inflicted, sometimes occasion it, as those from blows, kicks, etc. Inflammation arising from the above sources, from gonorrhoea, or spontaneously, is also a cause. Doubtless most of the cases witnessed are those arising from morbidly irritable bladder. Masturbation has been mentioned as influential; excessive sexual indulgence tends to the same result. The increased or perverted sensibility of the vesical neck is sometimes extreme, and prolonged treatment is often necessary.

Very little, if any *pathological change* takes place in the organs—even if long subjected to the action of causes productive of incontinence of urine—especially in the young. There may be slight thickening and inflammation of the bladder, and possibly a degree of enlargement of the prostate gland.

A periodical tendency, as is also occasionally observed in retention of urine, has sometimes characterized the complaint. Dr. Prout has remarked an inclination to it in all the juvenile members of certain families, particularly the females.

Prognostically, we may pronounce favourably, provided there is no organic disease, nor irremediable general condition. Occasional, and temporarily acting causes, admitting of modification and removal, may be lightly regarded. The influence of habit, so very powerful, may, in the majority of instances, be overcome.

Incontinence arising from blows or lithotomy, usually subsides favourably, and often spontaneously. The most obstinate cases, perhaps, are those occurring in children, and which depend on bad habits and association.

The effect of *sympathy* is strong in prolonging the habit; and children in boarding-schools, unless closely watched, and kept from

¹ Mr. Druitt says that in nine cases out of ten, this arises from obstruction. Mr. H. Thompson (*The Enlarged Prostate*) is perhaps quite as positive.

each other's beds at night, will be found less tractable than others, when affected. We have met with the most obstinate cases in such establishments. If nominally in single beds, they not infrequently leave them for those of their dormitory companions, and the practice of masturbation, doubtless often influential in causing incontinence of urine, is kept up by this cause more than by any other.

Prognosis cannot be so favourable in patients thus circumstanced, as in others.

Treatment.—In addition to the measures previously mentioned, in connection with the subject of irritable bladder, certain other remedies, both local and constitutional, may be enumerated. In cases following external injury, compression of the urethra by means of a spring-truss, has been tried with success. This measure must be conjoined with rest in the recumbent posture, and treatment directed against inflammatory signs. Mr. Hyslop, by the use of a bougie fastened (externally applied) with sticking-plaster, and adapted to the urinary canal, succeeded in conquering the disorder. Trousseau¹ recommends the introduction of a plug into the rectum (the pattern devised by himself, and improved by M. Mathieu, of Paris) in incontinence of urine, as well as for the cure of spermatorrhœa. He asserts success as the result in both maladies. The procedure would not answer the purpose in the incontinence of urine in females. Two might be used for them—one in the vagina, the other in the rectum—but only as a last resource.

Those cases resulting from pressure by the foetal head in protracted and severe labour are rarely influenced by treatment. They often, however, recover spontaneously. Sometimes they are never relieved. This is a species of paralysis of the bladder. The general treatment found available in analogous states is often efficacious in this. The same is true, to a certain extent, of those enfeebled vesical conditions which allow the dribbling of urine in old men who have led dissolute lives.² To a general tonic treatment, strychnine, in small doses, may be added—one-sixteenth of a grain, at first, thrice daily, increasing, gradually, to one-twelfth of a grain, and to one-tenth. Some practitioners counsel the use of cantharides with the above, and carry it even to strangury, with good effect.

¹ In a lecture on Impotence; a translation is to be found in the Charleston (S. C.) Medical Journal, and in the Southern Med. and Surg. Journal, October, 1856.

² Gross, *et al.*

Quinine is indicated in the intermittent cases, and has been successful.

Counter-irritants, blisters, cold water, and anodyne enemata, are often very useful. The latter, with suppositories of the same nature, have been found particularly efficacious in that form of incontinence referrible to irritable bladder. Trousseau has highly vaunted *belladonna* in this latter form. We have previously referred to its use. In certain of our own cases it proved unsatisfactory, whilst in others, a degree of advantage was observed. Trousseau recommends it in pilular form, and begins with one-fifth of a grain: in eight days, he doubles the dose, and in eight more, trebles it. The child is to be awakened an hour after going to bed, and made to urinate; after some days, increase the interval to one hour and a half, and so on, waking him later and later. If, during fifteen days, the difficulty diminishes or ceases, the dose of *belladonna* is to be lessened, or else given every alternate day. We confess to more faith in the removal of the urine systematically, and to the restriction of the amount of fluid drunk, etc., than to the medicament. Certainly, we have seen precisely such cases as those for which *belladonna* is thus advised, recover under the mechanical and hygienic course, which were rebellious under the drug alone, even perseveringly tried. To test *belladonna* fairly, however, it should be long continued, in gradually increased doses. Trousseau has given it for a year, that he might be sure of maintaining its action. Dr. Blanche, of Paris, found *belladonna* successful in children, after the failure of nearly every other remedy.¹ In some editorial remarks in the *Boston Medical and Surgical Journal* for March 18th, 1858, Dr. Minot very properly insists upon the necessity of *perseverance* in its use in order to secure success.

M. Pétrequin successfully employed an embrocation of the tincture of *nux vomica* to the loins and perinaeum, and also a seton, within the rectum, covered with the same medicine, in many cases of nocturnal incontinence of urine.

M. Gerdy, at La Charité, gave strychnine to two young patients affected with nocturnal incontinence of urine, and in doses of from one-quarter to one-half a grain daily, until marked spasmodic action of the muscles was produced. To this, small enemata, containing

¹ Amer. Journ. Med. Science (N. S.), vol. xvii. p. 187. (Gross.)

lphate of quinine, were added, and a cure was effected. Recurrence, however, took place in one patient, and repetition of the rychnine produced no beneficial effect.

Belladonna, three grains daily, was tried in another case, but the ~~we~~ only lasted for eight days. Remedies should not be too soon ~~andoned~~, on the occurrence of apparent recovery in these cases.

M. Robert cured two such cases by injections of a solution of itrate of silver. Ergot of rye and camphor (five to ten grains of ~~sch~~), daily, are also beneficial in this affection, and may be con-
ined with the local use of the nitrate of silver, and frictions of ~~umphor~~ ointment to the perinæum and pelvis at night. (*Annales de Médecine*, September, 1846.—*Edinburgh Medical Journal*, February, 1847.)

Dr. Fraene (*Gaz. Méd. de Paris*, Feb., 1847, and *Edinburgh Medical Journal*, March, 1847), after three weeks' unavailing treatment of incontinence of urine, gave *benzoic acid*. At first, six rains were administered morning and evening. On the fifth day, ~~ie~~ patient took twenty-four grains, and the next night the complaint disappeared, and did not return. The remedy was continued ~~r~~ some days. The patient was a girl of 13 years, who had had ~~ro~~ attacks of rheumatism; the incontinence had lasted four months. ~~he~~ rheumatic difficulty yielded to colchicum.

Cantharides, in certain cases of this complaint, have already been mentioned as serviceable. The following abstract of a case previously alluded to, seems to prove the occasional efficiency of the ~~medy~~.—L. M. M., a female child, two years and nine months old, ~~r~~markably strong and healthy. Every endeavour on the part of ~~ie~~ mother had been unavailingly made to prevent both diurnal and nocturnal incontinence of urine. Saw her Oct. 20th, 1856. ~~he~~ parents found her constantly wet with urine. None of this ~~ould~~ be obtained for analysis until Oct. 24th, because the child ~~ould~~ not be caught soon enough to be placed upon the urinal. ~~he~~ urine dribbled from her continually, as she ran about. One ~~unce~~ and a half was finally secured. Its colour was light yellow; ~~was~~ slightly turbid; moderately acid; specific gravity, 1.016. No ~~lbumen~~. Under the microscope, *epithelium*—the cause of the turbidity—was noticed; no other abnormal appearance. Oct. 28th. Directed a teaspoonful, four times daily, of the following mixture: R. ~~lquæ~~ Cinnamomi, ʒij; Syrupi Aurantii Corticis, ʒss; Mucilaginis

Acaciæ, 3j; Tincturæ Cantharidis, gtt. viij.—M. At the same visit, examined the child's genital organs, and found nothing abnormal. Passed a silver sound, and could detect no stone. Oct. 30th. Better. Has had more attention from her mother (who, at the first of the medical attendance, was lying-in); *has not wet herself* in the day-time nor night. Was (by direction) taken up, last night, to urinate, shortly after being put to bed (about one hour after); *has taken* eight doses of the medicine ordered. To renew the mixture when exhausted. Although the dose was small, yet an effect seemed due to the remedy.

November 13th. Very much improved. Does not now wet her clothes at all. Has been perseveringly watched by her mother and nurse; cold hip-baths and cantharides up to date last given. December 1st. Nearly free from the disorder. Does not require the medicine. Eight months afterwards, there had been no return of the infirmity.

Dr. Deiters¹ has found that *cubebs* have more effect than other medicines in the *enuresis of infants*. The affection may depend in them upon atony of the bladder only, or upon the presence of intestinal worms. In the first case, cubebs act as a tonic (and stimulant?);² in the second, as an anthelmintic. A large dose is given; for an infant, a few grains ("*deux pincées*") ; when the child is older, half a teaspoonful and more, two or three times a day. The effect produced is prompt and lasting, and although the incontinence sometimes reappears at intervals, these recurrences become less and less frequent, and at last cease. To obtain a radical cure, the treatment should be maintained for from three to eight weeks. Nothing untoward has yet been observed from it.

When incontinence is incurable, the portable urinals, now easily procured,³ are an invaluable resource. On account of the difficulty of cleansing India-rubber urinals, bladders or sausage-skins have been used;⁴ but the articles now on sale are nearly or quite unobjectionable on every score.

All artificial means to *constrict* the penis, for the purpose of

¹ *Preuss. Verein Zeitsch and Gaz. des Hôpitaux*, July, 1855. Dr. D. recommends the same drug in nocturnal seminal emissions.

² We have frequently remarked a very rapidly stimulating action of cubebs on the healthy bladder.

³ At surgical instrument establishments, and at many druggists' shops.

⁴ Prout. (*Op. cit.*)

arresting the urinary flow, are justly condemned; and cases abundantly ratifying this decision may be found on record.

Finally, many patients of a strumous diathesis, although cured with difficulty, yet may be so by great care and hygienic attention.

The cases arising from serious cerebro-spinal lesion are usually hopeless. In the slighter forms, judicious general treatment, and that specially directed to the circumstances of the case, may prove successful.

With regard to hygienic management, much may be done with children; and especially in nocturnal incontinence, we must be aided by the watchfulness of the mother or nurse in carrying out our remedial measures. The general orders—to diminish the amount of the drinks, especially towards night; to provide hard mattresses; to prevent the patients from lying upon the back when in bed; to wake them, and cause them to pass water soon after going to bed, and even twice or thrice before midnight; the cold shower bath or hip-bath; together with wholesome advice, and the often powerful influence of shame or punishment, are well known, and often succeed without any medication. As we have already remarked, due judgment must be exercised in the use of "the birch!"

X. VESICAL CALCULUS.

This is a subject which, in its pathological and therapeutical bearings, has elicited an extraordinary amount of studious investigation. To take it up in an extended manner, within our limits, would be impossible. Itself rather an occasion of vesical disorder than inherently a diseased condition, it still claims our notice. Its etiology, pathological effects, prognosis, and treatment, will therefore be considered. Whatever is demanded upon the chemistry of the subject will fitly appear under the latter head. It is obvious that our remarks must be brief, as a thorough exposition of this important subject would of itself require a volume. Moreover, it has such distinguished and accessible exponents, that, whilst we shall owe to them nearly all the information communicated, our references may be taken as finger-posts for those who wish to travel further on so interesting a road.

Etiological Considerations.—It is generally conceded that *renal concretions* are the most frequent source of calculi of the bladder.

The formation of the latter is an acknowledged rarity, unless it be effected upon a foreign nucleus. Phosphatic and cystic oxide concretions are exceptions to this rule. They are doubtless sometimes formed upon nuclei of their own substance. The introduction of foreign bodies, either by design or accident, is a frequent cause, affording a nucleus around which deposition is easy.

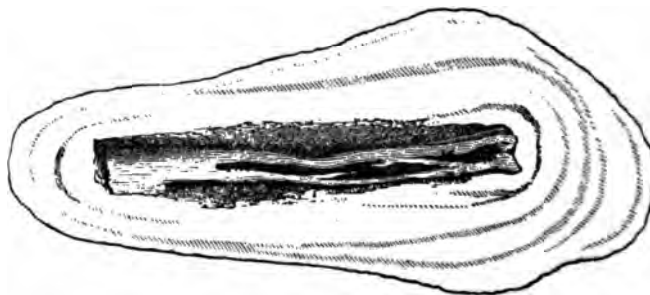
An interesting case of calculus formed upon a stem of the *Archangelica atropurpurea*, two and one-quarter inches in length, and about one-quarter of an inch in diameter, was reported to the Boston Society for Medical Improvement, Jan. 25th, 1858. The specimen was presented by Dr. J. Porter, Jr., of North Brookfield. (See *Boston Medical and Surgical Journal*, March 4th, 1858.)

We are indebted to the Secretary of the Society, Dr. F. E. Oliver, for the permission to use the cut which represents the calculus sawn through and showing the nucleus. The nucleus was of course introduced under the influence of prurient prompting. The stone was removed after death. An operation was not deemed justifiable when the patient was seen, on account of the feeble state to which he was reduced. The following extracts from the *Records* of the Society describe the stone:—

"The stone measured, at the time of its removal, $3\frac{1}{2}$ inches in length and $1\frac{1}{4}$ inch in width, and weighed $3\frac{1}{2}$ ounces. * * *

"About this foreign body (*i. e.* the nucleus) exists a cavity of some size, of which the parietes are quite crumbling. There is very

Fig. 28.



Calculus formed on a stem of *Archangelica atropurpurea*.

little crystalline appearance. The weight of the stone is at present, two and a half ounces, its length and diameter falling a little short of the original measurements. The accompanying cut represents

very accurately the size and appearance of the longitudinal section, with the nucleus in its cavity in the centre."

The calculus was of "the fusible species," according to an analysis by Dr. Bacon.

Any direct influence from *age*, can hardly be predicated. Still, it is remarkable how many cases are recorded in young persons, and even in infants. It is also probable that *congenital* calculi are more common than is now admitted. Of 6,042 cases, tabulated by Dr. Gross, more than half occurred previous to the twentieth year, and far the largest number of the whole under the age of ten years. That more calculi are formed in youth may be believed on another account, viz., the frequently long period during which they are carried. Many years often elapse before the symptoms are so urgent that an operation is sought for, or even sounding done. Another element for consideration, in this connection, is the difference to be noted in various countries; in some, children are very frequently calculous, in others the converse is true. In Wirtemberg, Switzerland, the Neapolitan States, certain portions of England (Norfolk County especially), and in our Western States, the greatest proportion of calculous cases is found to be among children.¹

It is a mooted question how far *hereditary predisposition* exerts an influence. Notwithstanding certain statements from high authority, we do not see why there should be any such agency. The conditions by no means correspond to those which affect the whole system in the way of transmission of important disease, as in the taint of scrofula, syphilis, tubercle, cancer, gout, etc. In so far as the latter affection may be thought instrumental in predisposing to stone, it may be exempted from the list; but why a man should have stone in the bladder merely because his father, grandfather, or uncle had it, does not appear. The instances reported by Civiale, where a calculous patient's mother, and his own child, had stone; and the other case, by the same surgeon, where two brothers, their grandfather, and two uncles, were afflicted with it, are certainly exceptional. Dr. Gross remarks that he has seen no such instances as these. The case related by Dr. Prout, of uric-acid calculi in father, son, and grandson, although a sequence, is

¹ Gross.

not a consequence. That families living in localities abounding in the causes of stone, either from the composition of the water drunk, or otherwise, should all have the complaint, is not remarkable, but affords no ground for supposing hereditary transmission. That a peculiar diathesis—the phosphatic, for example—may be transmitted from progenitor to descendants, is more plausible, yet this must be infrequent; and the repeated occurrence of lithic-acid calculi in one family is rather to be accounted for on the ground of certain general influences, affecting all the members nearly alike, than by any other explanation.

The *condition* of patients certainly seems to exert a strong influence. It is universally remarked that poverty numbers more victims than riches. When we consider the inferior, indigestible food most frequently taken by the poor; the often impure water they drink; their irregular habits and great exposures, and their multiform privations; it is not wonderful that calculous disorders very frequently afflict them. With disease first originating in the kidneys, combined with intemperance, depressing influences, and the mal-assimilation of food and drinks, all the elements of the lithic-acid, or of the phosphatic, diathesis are supplied.

It is well known that *climate* and *occupation* have a decided agency in the production of calculus. But, whilst the fact is asserted, we yet lack any reasonable explanation—excepting, perhaps, the influence which the differently constituted waters drunk have upon the economy. In certain very warm climates, where we might suppose calculous formations would be common—if the less amount of urine be considered an element, so much fluid passing off by the skin—we find them quite rare; whilst in other hot countries, they are precisely the converse. It is remarked that the Hollanders, in their own country, are rather prone to have calculus; but, transplanted to Batavia, in Java, they are nearly exempt.¹ Here we have evident climatic influence; but *how* is it exerted? The fact is the more inexplicable when we reflect that the climate of Holland, and the large use of the national diuretic, gin, would naturally tend to obviate the formation of both renal and vesical concretions; at all events, far more so than in the warmer country.

In England, calculous complaints are pronounced frequent. A

¹ Gross.

certain analogy between the climates of the two countries (Holland and Great Britain) may be remarked.¹

The occurrence of vesical calculus in New England may be safely pronounced very rare, comparatively with other portions of the United States. More especially has it been uncommon to find calculous patients residing in Boston or its immediate vicinity. Of late, however, cases of stone have been more frequently reported by our surgeons; and, during the past year, three calculous patients living in Boston, two always, the other from the age of three months, have been operated on. The last was cut bilaterally, at the hospital, by Dr. Cabot, and the writer witnessed the skillful removal of the calculus from the former, by Dr. R. M. Hedges, Demonstrator of Anatomy to the Medical College (Harv. Univ.). The latter operation was the lateral. Both these cases are related in the "*Records of the Boston Society for Medical Improvement*," in connection with another by Dr. Henry J. Bigelow, January 25th, 1856. See *Boston Medical and Surgical Journal*, March 16th, 1856.

It is consistent with good logic to believe that *sedentary occupations* predispose to, or at least favour, these diseases. Those who are actively employed, it is true, perspire more and, perhaps, therefore secrete less urine. It is stated by Dr. Gross that nearly all the calculous cases occurring in the western and southwestern States, particularly Ohio, Kentucky, and Tennessee, are in common labourers, farmers, and mechanics. Notwithstanding this, the positions of rest seem more likely to favour sabulous deposition, and to facilitate concretions around foreign bodies. We are cognizant of many cases in persons particularly studious and sedentary in their

¹ Dr. Grähs reported to a Swedish medical society, in 1851, the following opinion, viz.: That lithiasis, and especially stone in the bladder, is a very common disease in Russia, and particularly in Moscow. It occurs there in every station of life and at all ages; not as in Sweden, and, we may add, nearly everywhere, in the aged or the very young, especially when in the lower ranks. Dr. G. states that the great consumption of *quass*, a liquor analogous to French cider, has been accused as causative of this calculous tendency; he, however, believes that the qualities of the water and certain peculiarities of climate are to be credited with a powerful etiological influence.

Lithotomy is the usual operative treatment. The method of Frere Come, with the *lithotome caché*, is the favourite procedure. Professor Pohl, of the Catherine's Hospital, has operated (1851) on 1100 occasions. (*Förhandlingar vid Svenska Läkare-Sällskapets Sammankomster*, 1849-50; *Hygien, Med. Och. Pharm. Maanadskrift*, May, 1851; and *Edinburgh Monthly Journal of Medical Science*, September, 1851.)

habits. This cannot, however, be predicated of otherwise healthy *children*, since they generally are approximations to "perpetual motion."

It is a striking fact, attested by all the best observers, that soldiers, and especially sailors, are remarkably free from calculous disorders. Civiale, in his immense experience, only numbered three sailors. (1838.) Can the continual motion in which the latter are, the oscillation of the body, have any conservative influence? We may readily suppose this, and the more so, because it differs from any motion on land. Mr. Hutchinson, of England, states that, in sixteen years, the British naval service presented only eight cases of vesical calculus, and of these, three had stone on entering. So, at Greenwich Hospital, in twenty-seven years, among persons of all ages, from twelve and upwards, no operation for stone was performed,¹ and only one instance occurred in which there were symptoms of the presence of any. There were "small concretions" found in the kidneys and ureters of certain of the pensioners, *post-mortem*; these, however, were doubtless formed after they had left the sea.

The same testimony is given with regard to the army. One of the most remarkable statements in this connection is that by Sir James McGregor, that out of 340,000 patients, soldiers in the Peninsular campaign, no calculous case was observed from Dec., 1811, to June, 1814. In the Russian army, these affections are stated to be nearly unknown; the same is true of the French.

Much obscurity surrounds the question whether certain kinds of food, and especially of drinks, are not directly, and often indirectly, causative of stone.²

Most authors agree in referring a decided influence to such *ingesta* as contribute to indigestion with acidity and flatulence. Whatever, therefore, induces or aggravates dyspeptic states may be set down as tending to establish or confirm the calculous diathesis.

Magendie believed that a too exclusive meat diet contributed to stone, and that much of the immunity enjoyed by the inhabitants of hot countries was owing to their more vegetable food. The formation of uric acid is thus occasioned; and to this, many cases are traceable.³

¹ Gross.

² The idea that corn-bread and bacon are causative of vesical calculus is considered by Dr. Gross wholly unestablished by facts; and, indeed, we cannot see any good reason for the supposition.

³ Magendie; Crosse; Wilson Philip.

It has been suggested that the habitually excessive use of hot tea, etc., by weakening digestion, tends to aid in forming stone.

Fluids of a faulty nature dietetically, or which hold in suspension any cretaceous or sabulous particles, are seemingly obnoxious to the charge of direct causation, although many deny this. We have lately seen cases where the affection was distinctly traceable to drinking water impregnated with lime, and whilst the patients were in the western States, travelling only, not resident. Within a few months, one such instance came under our observation; the patient, after much suffering, being at last wholly relieved by passing, *per urethram*, an oxalate of lime concretion.

Dr. Gross, whilst he admits the plausibility of this source of stone, remarks that, if it be true that in Kentucky, Virginia, Alabama, Tennessee, and Ohio, most calculous cases occur in limestone regions, it is equally so "that many are found in the freestone districts of those States." The preponderance of cases in the limestone districts is, however, a fact of importance, no less than the stumbling of travellers over stone in such countries, who, it is very fair to suppose, would otherwise never have had it. That most persons escape who are thus *en route*, may be true; the influence of predisposition has great power; and, moreover, some may drink more water than others do, and that which is more highly impregnated.

In the case just referred to, the patient was considerably over thirty years of age, and since his relief by spontaneous discharge of the calculus, there have been no other like symptoms; showing quite conclusively that the cause and effect were alike occasional, and doubtless referrible to drinking water largely impregnated with lime.¹ Malt liquors have been accused of causing vesical calculus, it is somewhat difficult to see how.² The fact that sailors, who

¹ Mr. Coulson and others seemingly doubt any such influence.

² Except it be by exciting acidity and indigestion.—

Dr. Spencer Thomson, of Haunton, near Burton-on-Trent, published an account of a case of "pisiform lithic concretions," conjoined with albuminuria, in the *Monthly Journal of Medical Science*, Edinburgh, October, 1846, and in which he remarks that, "during hay and corn harvests, uric acid lithiasis is extremely common among the farm labourers in this part of England, in consequence of the large allowance of malt liquor, especially if the beer happens to be rather old and acid, or very new. The same disease, from the same cause, is of very common occurrence among the brewers' men of Burton-on-Trent."

He adds that "the probable origin of the pisiform or concrete condition of uric acid, will, it is imagined, account for the great tendency to the formation of calculus

rarely take them, are quite free from stone, does not seem of sufficient weight to warrant any conclusion.¹ Rhenish wines are thought to have an anti-lithic tendency;² the bitartrate of potash which these wines contain, Liebig supposes to be converted to a carbonate, and to act as an alkali against a uric acid tendency.³

All obstruction to the flow of urine, whether in the form of urethral stricture, hypertrophied prostate, contraction of the neck of the bladder, or the valvular flap of Amussat, in that region, etc. etc., tends to favour the formation of vesical calculus. The conjunction of stone with enlarged prostate is undoubted, and has been remarked by many observers.⁴ The concretions in such cases are nearly always *phosphatic* and of vesical origin.

Cerebral disease is apparently instrumental in producing calculus. It is found that the urine is generally supplied with saline matters in excess. The vesical mucous membrane is often diseased in paralysis and in certain other conditions; this state causes precipitation of the earthy phosphates from the urine, by the alkaline secretion poured out by the membrane.⁵ In paraplegic states, the bladder being involved, the urine is nearly always unhealthy; phosphatic deposition is frequent, and stone is often formed.

Morbid Appearances and Pathological Effects.—So successful, generally, are surgeons in removing all difficulty by an operation, that comparatively few opportunities offer for examining, *post-mortem*, the effects of stone upon the bladder. As might be inferred, a prolonged continuance of a foreign body in that organ, occasions certain noticeable lesions of structure and changes of form. Irritation, especially if the calculus be rough or spiculated, is gradually displaced by downright inflammation, with thickening of the lining-membrane; the bladder often becoming fasciculated, and a granular state of the mucous membrane being observed, with increase of vascularity, the occasional production of lymph, pus, blood and false membrane. Contraction of the organ sometimes occurs, and

which accompanies this form of excretion. It is evident that the retention of these concretions by their filaments, either in the pelvis of the kidney or in the lower part of the ureters, must afford the greatest facility for the further deposition of uric acid."

¹ Yet writers and observers of great note remark the fact; Murray Forbes, cited by Coulson, is one.

² Sœmmering and Leydig.

³ Gross, p. 437.

⁴ See Mr. Thompson's work on the Enlarged Prostate, Chapter XIV.

⁵ G. Owen Rees.

to such an extent that it will hardly hold more than an ounce or two of urine. There is, far less frequently, dilatation of the vesicle. Ulceration, generally seated near the *for. int.* and confined to one spot, or multiple, is often produced. Usually only a late recurrence, it is sometimes remarked quite early in the affection. There is a probability of scrofulous taint in the latter case.¹

Perforation and fistulous opening are now and then observed. The stone may be wholly, or only partially discharged. The *for. int.* seems peculiarly obnoxious to this accident. Calculi, however, make their exit into the vagina in the female, into the hypogastric and perineal regions and at the groin, more particularly, in males.

All the urinary organs sympathize more or less with the bladder when it contains calculus. The prostate gland is more often affected than the urethra, although the latter may become dilated by the lodgement of the stone, if small, from urinary pressure. In the neighbourhood of the prostate, there is often redness, with other evidences of the inflammatory state, upon the urethral lining-membrane: the latter may be either thickened, or considerably thinned. In extremely young patients even, the prostate is not infrequently involved. Congestion, inflammation and its results, even to abscess and sloughing, are occasionally observed. The prostate, at times, becomes hollowed out, and the cavity may lodge a calculus.

The evidences of inflammation and obstruction are also manifested in the ureters. These phenomena are more often witnessed in old persons and in tedious cases. The kidneys also feel the morbid influence. Sometimes they become, as it were, accustomed to the state of things, and if they have ever been involved, lose any appearances of active participation in the difficulty. The great straining in micturition leads, occasionally, to congestion about the rectum; hæmorrhoids, or thickening and prolapse of the intestinal mucous membrane, may ensue. There may also be abscess, with consecutive fistulæ, in the perineal region.

The seminal ducts are sometimes seriously affected. The vesicles are found atrophied and altered in their structure. There is sometimes the very grave feature of gangrene of the parts in this neighbourhood, as a sequence of inflammation.

When there is *spontaneous fracture* of the calculus, a very violent

¹ Gross.

inflammation of the bladder will be quite sure to follow. Much actual lesion of the internal vesical surface results in these instances, and the whole condition may be aggravated by *spicula* of the concretion lodging in the urethra, and producing difficulty with regard to the passage of the urine. There may be even complete retention.

Dr. Gross believes the occurrence of this fracture to be owing either to the powerful contraction of the muscular fibres of the bladder, or to concussion of several stones against each other, during violent bodily exercise.

The Various Diatheses; their Etiological Influence and Recent Views concerning them.—A stone dislodged from the kidney, and entered into the bladder, becomes a definite nucleus for accretions of various nature, whenever the requisite conditions exist for their formation. There is a fixed point for saturation in all saline solutions; but that of *super-saturation* is, of course, unfixed, and dependent on many influences.

Dr. Prout's definition of the former is at once simple and clear. He says the point of saturation is that "at which a solvent, in contact with a salt, can neither take up any more, nor deposit any more, of that salt." Therefore, when any salt is deposited from such a solution, without alteration of the temperature usual to it, there is *super-saturation*. The various solutions, then, regulate themselves, and maintain the point of saturation.

Starting from this general law, we easily perceive the process by which calculi increase, or by which they are formed on any nucleus. It has been well proved that calculi are not constantly increasing: for, if this were the case, their structure would be homogeneous, and not laminated; the latter state showing the existence of intervals between the accretive processes. The different nature of some concretions will prove this. Some are crystallizable, others amorphous; again, in the same calculus, there are distinct lines of demarcation, from whence, after a pause in the process, deposition has again commenced. One explanation of the existence of intervals is, that the constantly changing urine at one time favours deposition, at others not at all; so the newly-formed crust is found in a laminated shape, upon the original stony body, by necessity.¹ We thus often observe smooth *facettes*, worn by attrition of calculi one upon another; and

¹ Prout.

in such instances, it would seem that the process of deposition can hardly be so rapid as in those where, with multiple stone, there is less appearance of rubbing. Yet even in these, there must be attrition to a certain extent, notwithstanding the rapid increase of the concretions.

The *rationale* of calculous deposition being understood, a practical point to be determined is, what influence the different constitutional states (*diatheses*) have upon it, relatively to frequency, abundance, and liability to compose calculi. We have not space fully to examine and treat of this subject; but the latest and most authoritative views upon it will be adduced.

Of the diatheses considered important, the *lithic-acid* is the most frequently observed. Depositions of this nature from the urine are of two kinds—*amorphous*, or sedimentary, and *concrete*. Of the first variety, three colours are noticed—yellow, red, and pink. Sediment which is yellow, may be regarded as belonging either to healthy urine or to that from persons whose digestion is only slightly disordered, as from dietetic errors, exposure to atmospheric vicissitudes, etc.; the red (latteritious) sediment consorts with feverish and inflammatory states; the third, very rare, comparatively, attends chronic visceral disease, hectic fever and that of irritable type (irritative fever), and dropsy. Crystallized sediments are pure lithic acid.¹

When these deposits take place, abundantly, from the urine, concretions may form—adherent in, or easily leaving, the kidney—and, passing into the bladder, there furnish nuclei for stone.

In children and young persons, particularly, when symptoms of irritable bladder are noticed, we may fear supersaturation of the urine with lithic acid; and of course, a future calculus may be apprehended.

The children of gouty and dyspeptic parents are particularly liable to this condition. Adults are less prone than children to calculous formations of the lithic acid species. The occurrence of stone, at least from the period of puberty to the age of forty years, is most frequently due to accidental causes. After forty, *hæmotro-*

Fig. 29.



Lithic acid.

¹ Prout.

phia of the kidney, with a greater tendency to the formation of the lithates, is observed. In gouty persons, lithate of soda is often precipitated from the urine, and occasionally in very large quantity. In the aged, there is—commingled with the alkaline states of the urine arising from diseased vesical mucous membrane, or from renal difficulty—a peculiar form of lithic deposit, in “globules”¹ of small size, and often abundantly furnished by the kidneys. This gives strong ground for apprehension of the formation of both renal and vesical calculus.² The case is a difficult one to manage; for, if the secretion continue, we are nearly sure to have stone as a result; and, if it be suppressed, still more disastrous consequences.

At the extremes of life, we thus observe the conditions most influential in causing vesical calculus under the lithic diathesis.

An intermediate stage between the lithic and phosphatic diatheses has been described, and is believed to be peculiarly suited to the production of vesical calculus. The prevailing deposits are phosphate and carbonate of lime; and nearly always there is an accompanying diseased state of the mucous lining of the renal cavities, thus strongly predisposing to stone in the kidney, and, by consequence, to the same in the bladder.

It is remarked by the best authorities, that oxalate of lime concretions are but infrequently formed; consequently, we have less reason to fear a vesical calculus of this description than others. Often, small renal oxalate of lime concretions are voided *per urethram*—a happy result for the patient.

Dr. G. Owen Rees³ has lately announced his belief that the state which has hitherto been termed the *oxalic diathesis*, does not merit the title of an actual constitutional condition; that we are justified in considering it as “nothing more than an accidental and unimportant modification of the uric” acid diathesis. Oxalate of lime crystals, he shows, may be made manifest in many specimens of urine *by the application of heat*, when they are not otherwise discovered. This fact he refers to Dr. Aldridge, of Dublin. After

¹ Prout.

² The great danger of the suppression of lithic acid, in such patients, is insisted upon by Dr. Prout. Cardiac, and particularly cerebral, disorders (apoplexy, etc.) are not uncommon.

³ On Calculous Disease and its Consequences. Croonian Lectures for 1856.

heating urine largely impregnated with the lateritious sediment (urate of ammonia), and the disappearance of the latter by consequence, microscopic examination of the specimen will often show oxalate of lime crystals not before visible; and, on allowing the urine to stand still, more is thrown down. It is concluded that this salt is not existent in the blood, at least all chemical evidence thereof is very imperfect. Moreover, nearly identical symptoms are observed in those patients who abundantly excrete the urates, as in persons suffering from oxaluria; and sometimes the latter are quite free from any troublesome manifestations.

Fig. 30.



Oxalic deposit.

Dr. Prout remarks the singular fact that many affected with lithic deposition are never better than when passing urine most deeply loaded with it. Without endorsing the opinion that they are thus parting with a true *materies morbi*, he adopts such a reasoning for practical purposes. In Dr. Rees's experience, "the peculiar pathological conditions which have been said to connect themselves with the oxalic acid diathesis" have not been detected, and he decides that state to be, as above mentioned, "an accidental and unimportant modification of that most significant variation from health which consists in the excretion of uric acid or its compounds, in abnormally increased proportion." (*Op. cit.*, p. 9.)

With this view, the cases hitherto ranked under the separate title of oxalic acid diathesis, are either classed with such as arise in the uric acid condition of body, and as being especially analogous to the dyspeptic and gouty cases observed therein, or else are such as show oxalate of lime after heating the urine containing deposits of the urates.

There is, then, if this explanation be accepted, no oxalic acid diathesis proper; and, quoting Dr. Rees, "whenever oxalate of lime is found in the urine, it should be regarded as *produced after excretion*." The assertion of Lehmann is considered confirmatory of these opinions. He states that the morning urine (*urina sanguinis*), after standing for some hours, frequently shows abundant deposit of oxalate of lime; whilst *fresh* urine, from the same individual, does not furnish any trace of it; and Wöhler and Frerichs observed oxalate of lime in the urine, after injecting the urates into the blood.

The subject becomes greatly simplified if thus considered; and

we find that not only, as has long been admitted, does uric acid predominate amongst the urinary deposits, but that there are very few other constituents of calculi, comparatively speaking. Dr. Rees goes so far as to say that, "were it not for uric acid, calculus would be less frequently met with than tetanus."

The following statements in reference to a frequency of oxalate of lime deposits, observed in our neighbourhood, is well worthy of notice:—

Out of 1,122 specimens of urine examined during the past six years at the Massachusetts General Hospital, by Dr. Bacon, 909 contained deposits of some kind. There is a very remarkable frequency of *oxalate of lime* among the specimens of crystalline deposits; the following statement shows the proportion. "The order of frequency for the several crystalline deposits, including also amorphous phosphate of lime, is as follows:—

Oxalate of lime occurred in	.	.	.	.	.	380 specimens.
Urates	"	.	.	.	.	180 "
Earthy phosphates	"	.	.	.	.	108 "
Uric acid	"	.	.	.	.	46 "
Cystine	"	.	.	.	.	4 "

"The four deposits of cystine were from one patient. Comparing these numbers with the whole number of *deposits*, we obtain the following proportions:—

Oxalate of lime was found in	.	.	.	.	42 per cent. (nearly).
Urates were	"	.	.	.	20 per cent.
Earthy phosphates	"	.	.	.	12 per cent.
Uric acid was	"	.	.	.	5 per cent."

Dr. Bacon also states the general average of oxalate of lime deposits for the last three and a half years to be 37 per cent. The predominant form of this deposit in the hospital cases has been "the well-known octohedron." Dumb-bells and oval forms were noticed twenty-three times. Once only, in a specimen of urine containing zoosperms, Dr. Bacon observed dumb-bells without octohedra. "In one instance, oxalate of lime occurred in six-sided tables, resembling cystine in crystalline form; and once in long four-sided prisms, resembling the crystals of this substance so abundant in the tissues of plants."

In the majority of the above patients, the *morning urine* was that examined. (*Boston Medical and Surgical Journal*, February 4th, 1858.)

By a somewhat remarkable coincidence, the oxalate of lime has

lately been found unusually frequent in the practice of Dr. Collins, of Providence, R. I. In a report of cases made to the Providence Medical Association, December 7th, 1857, Dr. C. states that he had met with "nine cases since the first of July last." Six of these patients were males and three females. "His experience goes to confirm the statement of Dr. Bird, 'that the *oxalate is of far more frequent occurrence in the urine* than the deposits of earthy phosphates.'" (*Boston Medical and Surgical Journal*, March 11th, 1858.)

In a conversation with Dr. Bacon, relative to the recently observed frequency of oxalate of lime in the urine, we were struck with the plausibility of his remarks as to the etiological influence of our climate, habits, and diet in its production. He adverted to our less frequent use of the light wines so freely consumed abroad, and also to the state of continual excitement which characterizes the American people. We have often had occasion to notice the latter element of disease, as being in various ways operative upon all classes of our population.

As Dr. Bacon also very justly remarked, much of the European urinoscopy, and the deductions therefrom, must be modified in various ways to be applicable in this country.

We have already referred to the influence exercised by morbid states, together with an alkaline secretion from the mucous lining-membrane of the urinary organs, in the deposition of the phosphates, and the consequent production of phosphatic calculi. Dr. G. O. Rees is in favour of separating the latter from any distinct diathesis, as a cause, and refers them to the mechanical action of other calculous matter.

It being possible, in many cases, to trace uric acid signs in the early history of a vesical affection finally characterized by phosphatic deposits, these, it is argued, may be almost entirely ascribed to an unhealthy bladder, induced by the primitive uric acid disorder.

The theory of the formation of vesical calculus need not largely engage us. Scherer believes that uric acid is deposited from the urine by reason of a metamorphosis of the urinary pigment—a species of decomposition analogous to fermentation, and denominated by this chemist "the acid urinary fermentation." His theory is that the vesical mucus acts as a ferment on the extractive urinary pigment, and that lactic acid is consequently developed.

By Liebig and Lehmann, acetic acid has been observed under

similar circumstances. This view, however, seems hardly necessary to explain the facts, nor is it quite consistent with what is observed. As has been remarked, it is difficult to see how fermentation can take place in the kidney, because the urine is constantly filtering from it. Dr. Rees's idea is that which will appear to any one, on reflection, much more natural and reasonable: viz., that the frequently increased quantity of uric acid, and its insoluble nature, are the causes of deposition. Scherer's notion is, that when what he terms "acid fermentation" takes place in abundance, uric acid will be thrown down from urine a long time retained in the bladder, and thus furnish a nucleus for calculus. The more mechanical explanation above offered seems the most satisfactory.

Disease of the vesical mucous membrane has been mentioned as being implicated in the production of phosphatic concretions. Many refer this action to the membrane itself, and assert that it actually secretes the phosphates;¹ but it is now believed, with more plausibility, that the *alkaline secretion*, poured out by the affected membrane, is the agent which throws down the earthy salts from the urine. A certain amount of mechanical influence is also claimed for the thick mucous secretion; the fragmentary epithelium, and the larger mucous corpuscles, tend to entangle and retain any deposits made.²

If, therefore, the mucous surface of the bladder remain healthy, there is comparatively very little chance for accretion upon a uric acid deposit. It should be also remembered that the vesical, urethral, and renal mucous membranes are continuous, and liable to be simultaneously affected; thus the same chemical action, to a certain extent, may arise in them. The difference would be only in the amount of secretion, and the time the fluid remains upon a certain point. Of course, the longer stay of the urine in the bladder favours large concretions, especially with a diseased mucous surface; it is thus that immense phosphatic collections often take place.

In some gouty subjects, the deposit from the urine is not a crystalline uric acid, but is frequently found in the form of an *agglutination*, upon the sides of the urinal.

Dr. Prout used to speak of this as an element in the induction of calculous disease; and likewise, referring to the transition of the oxalate of lime diathesis into the phosphatic, he says "that phos-

¹ Heurteloup; Marcet.

² Rees.

phatic deposition is oftener an *induced* state than an original one; and the phosphatic diathesis is seemingly the *point towards which all the other diatheses converge*." Others confidently assert that disease of the mucous lining is the foundation of the mischief. (Rees.) Both the last observers mention oxalate of lime following gouty attacks. Very much in this way the calculi formed wholly of phosphates¹ are to be accounted for; the diseased mucous lining is the source of their production, through its alkaline secretion, partly by a chemical, partly by a mechanical process. Paralytic cases, and others—such as herniated and sacculated bladder—where urine is long retained, and becomes altered, are examples.

The *cystic oxide* calculus² is exceedingly rare; those of *carbonate*

Fig. 31.



Crystals of triple phosphate under the microscope. This and the two preceding figures are taken from Dr. Golding Bird's work.

¹ A rare occurrence. (Rees *et al.*)

² Discovered by Dr. Wollaston, in 1810. (*Philosoph. Transactions.*)

A calculus composed of *cystine*, in a nearly pure state, was shown to the Boston Society for Medical Improvement, June 22d, 1857, by Dr. J. M. Warren. It came from a man under his care for fractured thigh, at the hospital. Its expulsion was preceded by renal "symptoms," of marked intensity, and the patient had previously passed small pieces of the same substance.

Dr. Bacon, who analyzed the urine and the concretion, states that the latter weighed three-quarters of a grain, and that several smaller ones had also been passed *per urethram*, "all composed of pure cystine. The urine also contained a deposit of cystine in large microscopic crystals." (*Boston Medical and Surgical Journal*, August 20th, 1857.)

Two instances of cystine in the urine and of cystic oxide calculus have very lately (February 13th, 1858) been mentioned in the *Lancet*. One was in a case managed by Mr. Birkett, at Guy's Hospital, London. Lithotripsy was performed five times upon this patient, and a fragment of the stone which escaped was found to be composed of cystine. The reporter remarks the rarity of these deposits, and refers to the "very large quantity of sulphur entering into their composition, sometimes amounting to as much as thirty per cent." After referring the student to Dr. Beale's work, "On the Use of the Microscope in Clinical Medicine," Part I., it is added that "cystine forms a bulky, almost colourless deposit in the urine, which has the odour of sweetbrier. This last peculiarity may sometimes lead to an examination." An unusual quantity of urine was passed by Mr. Birkett's patient, after the first few crushings; its tint was "dull greenish or brown," and much mucus was also voided; this condition was ascribed partly to the decomposition of the calculus. "Cystine is insoluble in acetic acid, but readily soluble in the caustic alkalies. Ammonia is a good agent to employ for this purpose, because the crystals will become deposited again during slow evaporation." (*Loc. cit.*)

The second of the two instances referred to was an "excellent example" from the

of lime, silicic acid, and uric oxide are nearly as infrequent. The latter, moreover, are almost identical with uric acid. The bone earth (phosphate of lime) calculi are uncommon; these, united with the triple (ammoniaco-magnesian) phosphate, constitute the *fusible* calculus. In the alternating calculi,¹ we may observe that the rule is for phosphates to succeed the other deposits; this is, to a certain extent, confirmatory of some of the doctrines just noticed.

These views, and the relative frequency of the different calculous formations, have an important bearing upon our subject. Whatever tends to induce renal concretions, of course renders the patient liable to vesical calculus. In every light, the consideration of these points is valuable—diagnostically, pathologically, therapeutically.

The composition of calculi has elicited a vast deal of study and investigation, and constantly engages the practitioner's attention. Occasionally, calculi assume the most fantastic forms; and this happens also when no peculiarly-shaped foreign body has served as a nucleus.

Some interesting specimens of urinary calculus have lately been exhibited at the meetings of the "Pathological Society of Philadelphia." One was shown, December 9th, 1857, by Dr. Forbes, and was taken from the bladder *post-mortem*. Its weight was 726 grains. "The bladder was sacciform and much thickened; the calculus was of the mulberry variety, and of a dark colour." In reference to the colour, Dr. Mitchell said the presence of oxalate of lime in the urine or in calcular form was liable to irritate the viscus, and cause "a bloody effusion, which frequently tinges the ~~stone~~ bone, and causes it to contain much iron. Dr. Mitchell had found iron in a large number of urinary calculi; and indeed a little iron is always present in healthy urine, which would be increased if blood were effused. He had examined stones with regard to other metals, especially copper, which he had found in biliary, but not in urinary calculi." (*North American Medico-Chirurgical Review*, March, 1858.)

urine of "an overworked medical student, whose brain had been greatly taxed by study previous to examination." The suggestion is offered, by the editor of the *Lancet*, that students similarly situated "may be enabled to meet with these deposits in their own urine." We hope that few medical or other students will be reduced to such straits as to "overwork" their brains; and that by a judicious outlay of their time and study, they may "be enabled to meet" their examinations without going through a course of *cystine* in their own persons.

¹ Composed, usually, of alternating layers of lithic acid and oxalate of lime.

The next specimen shown (December 23d, 1857) was "mace-shaped," and was also removed *post-mortem*, by Dr. Pancoast. An excellent representation is given of this stone. It was composed of oxalate of lime, phosphate of ammonia, and magnesia, with phosphate of lime. The reporter was at a loss to account for the "singular form" of this "pathological curiosity." (*Loc. cit.*)

January 13th, 1858, Dr. Darrach presented, for Dr. Pepper, a specimen still more singular in form. Both these last-named calculi can be much better understood, as to shape, by the illustrations given of them in connection with the reports than by any verbal description. The one shown by Dr. Darrach was of oxalate of lime, and, like the two former, was removed after death, from a man eighty years old. There were several smaller concretions in the bladder. No history of the case was obtained, except that the patient suffered very much, a short time before death, from pain; and retention of urine was supposed. "The physicians were unable to introduce a catheter, and after death the bladder was found about the size of the fist, and its walls much thickened." (*Loc. cit.*) Dr. Darrach states his belief that the calculus had not been formed around any foreign body.

Fig. 32.



Calculus of singular shape. (Probably oxalate of lime.) From Professor Mussey's Collection (Cincinnati) from Dr. Gross's Works.

The latter two specimens are mentioned in connection with the peculiarly-shaped calculus here represented. (See figure.)

TREATMENT.

I. MEDICAL AND CHEMICAL.—We premise that, when the presence of stone in the bladder is ascertained, the best course is to *remove it surgically*; provided there be no absolute contraindications. Such will be hereafter referred to. When they exist, or when patients refuse to be operated upon, and yet desire treatment, we may resort to palliative measures, or to the use of certain substances reputed to be instrumental in *dissolving or decomposing* the stone. With some sorts of calculi, this is readily effected, and others, these means are powerless.

Much success is often attained by *general hygienic and remedial measures*. The maintenance of care of the *general health* is now of the best preparation for the lithotrite or the knife. Thus, we endeavour to correct the diatheses whose *excessive manifestation*

attract our attention, and we treat the conditions which cause or aggravate them. To obviate dyspepsia, gouty and rheumatic tendencies, and, if the latter be present, to prevent repercussion of the maladies; to banish anxiety, grief, and depression; to warn against the reckless indulgence of any unbridled passion—as of the venereal instinct; to guard patients against wet and cold, sudden alternations of temperature, and rough and prolonged exercise; to look carefully after the digestive functions, avoiding intemperance in all the *ingesta*; to use special precautions against unwholesome or calcareously impregnated drinks, or such as are highly acescent, malt liquors, etc., are general directions, which, if scrupulously observed, often so far annul the discomforts attendant upon vesical calculus, that the patient defers, for years perhaps, any more decided interference.

It has been remarked, and it is evident, that a calculus which has just traversed a ureter can pass through the urethra. We, therefore, in commencing medical treatment in such cases, endeavour to favour the exit of the stone, provided many days elapse and it does not pass spontaneously. After a severe nephritic attack, from a calculus passing down a ureter, there is generally a pause of the offending body in its more commodious quarters, for an indefinite period, before exciting new symptoms; generally, this lasts until the irritable state induced subsides. If the vesical sphincter and neck be affected with spasm, in consequence of the irritation, *antispasmodics* are plainly indicated. After these, we endeavour to *wash out* the concretion by the use of diuretics. Purgation occasionally assists us in these attempts. If lithic acid be the abnormal product, the proper purgatives are Rochelle salts and colchicum, with, perhaps, hyoscyamus, whilst diluents are freely employed. Large draughts of simple distilled water, and of mucilaginous liquids, as flaxseed tea, barley-water, etc., are advantageous in diluting the urine and producing a free flow of it. Dr. Prout mentions soda or potash-water, adding to either, spirits of nitric ether, or compound spirits of juniper.

In cases of *oxalate of lime* concretions, whilst the same measures should be used to allay an irritable state of the bladder, the diluted nitro-muriatic acid is the best diluent, distilled water being used as its vehicle.

For *phosphatic* concretions, sedatives, preliminarily, in a decided manner, are necessary; and the free use of the so-called soda-water

(carbonic acid water) is beneficial as a drink. Water, with infusion of lemon-juice, or slightly impregnated with nitro-muriatic acid,¹ is also excellent.

Belladonna frictions on the perinæum, with the intent temporarily to paralyze the muscular fibres near the *cervix vesicæ*, have been used in children with alleged success, by M. Aberle, a French writer; concretions have been passed within a few hours after such an application.²

Care should be taken to ascertain whether and when the concretion passes.³ To facilitate still more the escape of the offending body, let the well-known expedients be adopted of leaning forwards, or even lying on the belly, when micturating; and of grasping the urethra and allowing the urine to distend it, and then suddenly to pass off. The patient, if intelligent, can easily do this. The surgeon may aid in effecting the object by passing a bougie, so as to effect dilatation, and directing the patient, when the canal is suitably enlarged, to pass his water whilst the instrument is slowly withdrawn, at the same time bending forwards; the stone may follow.

The ingenious expedient of the Egyptians for extraction of calculi *per urethram*⁴ is quite as applicable now as when devised, and may appropriately be mentioned in this connection. The urethra was dilated by insufflation, and the introduction of extensible cartilaginous tubes, so that the calculus could pass into it, and it was aided in this by pressure made by a finger in the rectum. A wooden canula was then passed down until it touched the stone, and, by suction, the latter was held fast to the orifice of the inserted portion of the tube, and withdrawn with it.

Dr. Gross suggests the use of an exhausting syringe instead of the mouth of the operator.

Small calculi have been withdrawn engaged in the eyelet-holes of the catheter, being forced into the instrument by the rush of the urine. One hundred and fifty were thus extracted by Mr. George Bell, of Edinburgh.⁵ When believed to exist in numbers, a full-sized, large-eyed catheter may be successfully used. Forceps, and a scoop of peculiar construction, are sometimes employed when a

¹ Prout.

² Gross.

³ Such patients should always void urine into a vessel. If they go to a water-closet, they may put a piece of muslin over the urethral orifice.

⁴ Dr. Willis, Brit. and For. Med.-Chir. Review; Gross. (*Op. cit.*, p. 516.)

⁵ Quoted by Gross.

concretion is lodged in the urethra, and answer the purpose w
Sir Astley Cooper, Hunter, and others, have devised ingenic
instruments of this description. In using them, great care must

Fig. 33.



Fig. 34.



Fig. 35.



Fig. 33. Sir Astley Cooper's forceps. (After FERGUSON.)

Fig. 34. Hunter's forceps. (After GROSS.)

Fig. 35. Bonnet's articulated urethral scoop. (After GROSS.)

taken not to wound the mucous membrane of the urethra or of the bladder, when an instrument is passed into that viscus in search of small calculi. In certain cases, the calculus has been *snared* and successfully withdrawn by means of a loop of fine silver wire passed through a catheter.¹ The analogous method of noosing nasal polypi, merits, says Dr. Gross, a more frequent trial.

The Urine.—General allusion has already been made to the correction of certain diatheses. When the urine is *too acid*, the judi-

¹ One such instance is related by Dr. Conant (*Medical Repository, New Series*, vol. iv. p. 184, New York, 1818; see also Gross, *op. cit.*).

cious use of alkaline remedies is indicated. The bicarbonates of soda and of potash are universally esteemed. Some prefer the former, thinking it more decidedly instrumental in dulling the sensitiveness of the urinary mucous surfaces. Dr. Gross believes this, and directs a strong decoction of *uva ursi*, or of hops, into each ounce of which thirty grains of soda are put, and this amount is given three or four times daily, gradually increasing it to even twice the number of grains, if the stomach bears it.

The *liquor potassæ*, as well as the carbonate, is found very serviceable, especially with decided dyspeptics. It may be administered in any mucilaginous liquid; also with advantage in bitter infusions, as those of gentian, quassia, or cinchona. It must be largely diluted; twenty to forty drops is a proper dose, thrice a day.

A celebrated remedy, in these cases, is Castile soap and lime-water, or lime in another form—as in egg-shells—the carbonate. The famous empirical preparation of Mrs. Stephens consisted of egg-shells and the above-named soap, and was very successful. Cases of undoubted dissolution of calculi by it are on record. Magnesia and common lye are also recommended.

French writers place much reliance, and, it would seem, justly, upon their celebrated mineral waters. Those of Vichy, which contain much free carbonic acid, and nearly 3iss of bicarbonate of soda for every 1000 drachms of fluid, have an established reputation. Many calculous patients in the United States have derived great benefit from waters of similar qualities with those of Vichy.¹

In decided alkalinity of the urine, it has always been concluded that acids are required—and generally this is true—a marked, and often rapid change for the better, following their employment. But there are many patients who may even need *alkalies*, in order to meet certain indications. As a general rule, however, the antagonistic treatment is the available one.

We should remember that in what is termed² the oxalic acid diathesis, tonics are often strikingly beneficial, and indeed imperatively demanded.

Dr. Rees has lately called attention to this fact, and he remarks that the mineral acids do not so decidedly acidify the urine as supposed.³

¹ Gross.

² Or has always been, hitherto. (*Vide* p. 395.

³ So, in using *alkalies*, it may be some time before their action is perceived. Dr. Rees mentions scruple doses of carbonate of potash as having been given two weeks before alkaline urine was induced.

Recommending "purgatives, mild mercurial alteratives, and the mineral acids (especially the nitric acid)," as particularly tending to relieve congested and other states of the liver and chylopoietic viscera, more or less abnormal—and which tend to increase a discharge of the urates—he particularly insists upon the fact that mineral acids are not absolutely indispensable, in the management of these cases. "Soda, rhubarb, and calumba, twice a day, and an alterative at night, answer every purpose, the tonic action being the great essential, whether it be produced upon the stomach by an alkali, or by an acid." (*Op. cit.*, p. 19.)

The use of alkaline citrates bids fair to supersede that of caustic and carbonated alkalies in those states of the urine requiring alkaline treatment. The salts recommended are the citrate, and sometimes the tartrate of potash. The latter is especially useful when there is constipation. In London, a "citrated water" is prepared, which is taken at dinner by patients requiring these remedies. Each pint of water contains half a grain of the citrate of potash, and is charged with carbonic acid gas, making a pleasant beverage. It may be taken alone, or combined with such alcoholic stimuli as are thought advisable by the attending physician. A half teaspoonful of the citrate of potash may be taken early in the morning, in a draught of water. By these means, and occasionally adding sedatives or tonics, *pro re nata*, many evil results of excess of uric acid may be prevented. It is believed that phosphatic deposits will also thus be kept from forming about other nuclei, and especially that the use of the citrates alluded to, is prophylactic not only in the uric, but in the oxalate of lime diathesis.

As yet, there exists no prophylaxis against the tendency to the deposition of cystic oxide, uric oxide, carbonate of lime and silicic acid, the rarest forms of concretions.

It is a great object to render the urine alkaline in irritable states of the bladder accompanying calculus, and particularly so before resorting to lithotritry or lithotomy. *After* these operations, also, the neutral salts above mentioned are esteemed of great value, in connection with mucilaginous drinks, sedatives, etc.

Solvents of Calculi.—Besides the Castile soap and lime-water, weak solutions of the caustic alkalies have been taken;¹ and quite

¹ The patient whose extraordinary case is reported by Professor Eve (*Surgical Cases*, p. 446), who passed *forty-five pounds* of calculous matter in the space of fifteen years—and in whom the tendency still continued—found *Hacrem* oil the

extended use has been made of injections of various solutions into the bladder, so as to obtain a direct action upon the concretion. In addition to simple water and the alkaline solutions previously referred to, many *natural* alkaline waters have been employed with advantage.

The gastric juice of the lower animals; solutions of borate of soda; malic acid; nitro-saccharate of lead (one grain of the salt, superacidulated with five drops of strong acetic acid to each fluid-ounce of water, especially against the phosphates); nitric acid (two drops to the ounce of water—Brodie); and muriatic acid—have been frequently tried. Although there has occasionally been partial, and sometimes complete success by these means, yet the length of time required for the treatment involving much risk, both by the delay itself and often doubtless by the substances used, the uncertainty of the result and the cost of submitting to so protracted a course, render the method unpopular, and, in most instances, inadvisable.

The destruction of urinary calculi by an alkaline water, is by a sort of disintegrating process, rather than by solution.¹ Calculi of oxalate or phosphate of lime mingled with small proportions of lithic acid, lithate of ammonia, or triple phosphate, have readily yielded to this means.

From the experiments of MM. Petit and Chevalier, we learn that Vichy water, which is a solution of bicarbonate of soda in water supersaturated with carbonic acid, dissolves cystic and xanthic oxide calculi as promptly as it does lithic acid and triple phosphate; consequently, nineteen-twentieths of the urinary calculi are attacked by this water.

It is found, however, that the confessedly slow action of reputed solvents, whether taken by the mouth, or directly applied to urinary concretions, is chiefly upon the animal matters they contain; that the result of injections is problematical, and the danger of inflammation not counterbalanced, as in lithotrity, by a rapid destruction of the calculus.²

If it be decided to make a trial of injections, with the intent to most beneficial medicine. Twenty-five drops were taken every other night. "He assures me," says Prof. E., "that this medicine not only acts as a diuretic, but prevents the formation of calculi of large size, and that when he takes it the most freely, the concretions are voided in the form of sand."

¹ Coulson.

² Peloreze, cited by Coulson; *Comptes Rendus de l'Académie des Sciences*, vol. xiv.

dissolve the stone, great caution must be exercised lest too much of the substances employed be thrown in at first. There is risk of exciting inflammation by this, whilst by patience, the bladder will become somewhat accustomed to the process. Evacuation of the urine, naturally, or by the catheter, must of course be effected just prior to employing the injection, and the latter may be used thrice daily, if borne—always, however, beginning with one trial daily, and if that alone seem indicated, refraining from forcing the procedure. A double catheter, for efficiently washing out the bladder, is nearly always needed; especially if there be hypersecretion of thick, glairy mucus. It is also advisable to administer, by the mouth, medicines tending to the same result as the injections. Many months of persevering effort may be needed, before any impression is made; and the patience of all parties is likely to be exhausted.¹

II. SURGICAL.—1. *Lithotomy or Lithotripsy*. It falls within our province to mention this method of removing urinary concretions, chiefly in relation to its advisability, its value compared with lithotomy, the best method and instruments for doing the operation, and the average results.

The intention of surgeons is now to crush and pulverize the stone as effectually as possible; originally, it was only endeavoured to

¹ Phosphatic calculi, it is well known, may be entirely or nearly reduced by nitric acid, much diluted, thrown into the bladder. Solution of borax, and Vichy water, as previously stated, have obtained a certain amount of success with lithic acid concretions. The *uratic* calculi, according to the best authorities, resist all solvents. Mr. Conison, and Mr. Henry Thompson (*Enlarged Prostate*, pp. 310, 311), refer to the experiments of Dr. Hoskins, of Guernsey, England, with solutions decomposed of calculi (nitro-saccharate of lead, etc.), as being more energetic and less injurious than any simple solvent. Lately, Dr. H. has employed the pure acetate of lead (one grain to the ounce of water) with the smallest possible quantity of acetic acid, just enough to secure solution, and to render the liquid transparent. The lithotrite and the knife will hardly be less in requisition, for all that it seems possible to effect by medicinal means.

In the paper entitled *Chemical Final Causes* (*Edinburgh Essays*, by members of the University, 1856; Edinburgh, Adam and Charles Black, 1857) is the following remark, which we are glad to have the opportunity of quoting:—

"It seems worth the consideration of surgeons, whether common phosphoric acid, in virtue of its unirritating action on living tissues, and its solvent action on phosphatic calculi, may not, as a *litholytic*, be brought in direct contact with vesical concretions of the non-acid class, and render, in some cases, operations unnecessary." (p. 323.) The author of this paper is George Wilson, M. D., F. R. S. E., Regius Professor of Technology in the University.

seize, bore, and break it into fragments. *Lithotripsy* is, therefore, the truest expression descriptive of the operation.

To Civiale, indisputably, belongs the merit of introducing the procedure thoroughly into urinary surgery. He is acknowledged as not only the leader in the operation, but, as might be expected, he numbers a vast majority of cases over all other surgeons. He has had many distinguished successors, both in Europe and in this country—MM. Leroy d'Etiolles, Amussat, Costello, Heurteloup, Breschet, Bançal, Cazenave, of France; Ivánchich, of Vienna; Sir Philip Crampton, Mr. Key, Mr. Fergusson, Mr. Coulson, and others, of London; Mr. Teale, of Leeds, and many more abroad, together with several of our own distinguished surgeons. We have witnessed skilful and successful lithotripsy by Dr. J. M. Warren, of Boston, and similar results have followed the operation in the hands of Drs. Gibson, Pancoast, N. R. Smith, Randolph and others. Dr. Depeyre, of New York, is said to have been the first operator by this method in the United States.

Cases to which the Operation is Suited.—The operation may be performed either upon young or old subjects, provided there is no existing organic disease of the urinary organs, particularly of the bladder and kidneys, or of the surrounding viscera, and if the constitution and general health be good. Enlargement of the prostate gland, especially if extreme, embarrasses lithotripsy as well as lithotomy.

The surgeon will be disposed to adopt this method in cases where the calculus is small, soft, and lying loosely in an unirritated and non-sacculated bladder. Great hypertrophy or contraction of the latter organ should preclude lithotripsy—there must be room enough to use the instrument without force. It would be, as a rule, bad practice to attempt to crush a mulberry calculus, on account of its extreme hardness. Often, too, the great size of the lithic acid calculus defies attempts at safe and efficient crushing. The large number of resulting fragments, also, if the stone be broken, is a dangerous element in the case. Cystitis would be likely to follow, after the necessarily frequent introduction of the instruments, added to the pressure of the broken pieces.

The requisite amount of anatomical knowledge and surgical skill must be predicated of an operator. Instruments of the simplest description, even, must not be hastily, carelessly, or roughly used

about or within the urinary organs—much less those requisite for lithontriptic operations.

Comparative Value of the Operation with Lithotomy.—Lithotomy continues to number vastly more adherents than lithotripsy, and on many just grounds. Some of these have been already intimated. Certainly, a large, hard, irregular stone (as the oxalate of lime) should be extracted entire. If necessary and possible to break it, in very remarkable cases, it would still be advisable to lithotomize the patient, rather than subject him to the risks of renewed attempts at crushing. In children, lithotomy is preferable; the bladder in them is small, prone to irritation, and they are unable to endure reiterated, prolonged, and severe lithotripsy. It is believed that about an equal portion of those in middle life and old age may be operated upon by crushing as by cutting.¹ Lithotripsy is easiest and best for nearly all female cases; it is more applicable to small, single calculi, even if hard, than to multiple stones; and to cases where from disease, either general or of the parts, cutting would be injurious. Lithotomy is best when the bladder is very irritable, unless the state be easily quieted, and especially if the stone seems the chief exciting cause. When *time* is of more than usual value, either from constitutional or other causes, lithotomy is preferable; so when excessive pain is produced by the manipulation of instruments within the bladder. If it be said that the use of anæsthetics annuls this provision, we admit the fact, but question the practice, *as a rule*. It is easy for even skilful hands to do much mischief with lithotriptic implements. Breschet, Tanchon and Bancal are reported to have perforated the bladder. This, done without anæsthetics, may much more readily occur if they are used. The patient could give no available intimation of suffering, even if the mucous coat were seized and crushed, instead of, or with, the stone. It seems preferable to confine lithotripsy to cases where it is painless or nearly so, and which are not by any means infrequent. As would naturally be supposed, lithotripsy is more liable to the occurrence of relapses, than lithotomy—a serious objection to it. It is not surprising that fragments of the concretion, remaining in the bladder after crushing, should soon give rise to new calculous symptoms. There are few persons who would be willing, advisedly, to undergo lithotripsy forty-eight times, in twenty years even, as in

¹ Mr. Lee, cited by Coulson.

a case reported by Mr. Coulson. That in this instance a remarkable immunity from bad results existed, may be inferred from the patient having attained the age of 83 years. We think it a very exceptional example.

It is asserted that but few *data* exist in England from which correct conclusions can be drawn with regard to the comparative merits of the two operations. The same is true of the United States. The operation has been comparatively very infrequently performed, whilst lithotomy is constantly done. Dr. Gross remarks that, if not on the wane, it (lithotripsy) certainly is not on the increase. Civiale is the only surgeon the number of whose cases has justified statistical observations, and he has prepared certain tables. The downright charge of mendacity made upon him, whilst it has doubtless often been instigated by jealousy, has contributed to render professional authorities somewhat distrustful of his conclusions. That he should have had a very large number of successful cases, might be expected, when his devotion to this particular branch, and the almost constant opportunities he has had, for years, of practising the operation, are considered. Those who have witnessed his refined diagnostic tact, and delicate and successful manipulation, will be inclined to join us in this opinion.

Ivánchich, of Vienna, according to Dr. Gross, has, in thirteen years, operated by crushing nearly one hundred times, and almost always successfully. "In his first twenty-four cases, he lost only one."

The Operation; preparation for it; best method and instruments.—The patient, if in good health, may be operated upon at once, with only the usual precautions. Where there is constitutional disturbance, even if slight, we should endeavour to rectify it. All morbid susceptibility of the urinary passages should be obviated, if possible; antiphlogistic and anodyne measures are often required; dyspeptic conditions must be remedied, and quietude of all the related organs ensured.

Dilatation of the urethra is the next step. It is advised by some practitioners not to dilate the urethra if the lithotrite passes easily. A properly graduated series of silver catheters or of flexible sounds readily accomplishes this object in a few days,¹ by operations instituted three or four times daily, or only once a day in

¹ Malgaigne says eight days.

certain cases. Not only do we obtain space by this procedure, for the passage of instruments and fragments, but the urethra and bladder become somewhat accustomed to the use of the former. Mr. Coulson, however, thinks that all the tranquillity possible should be ensured to the urethra.

Anæsthesia may often be necessary, though generally unadvisable in adults. Children are placed by it out of the risk of disturbing the operator by their want of self-control, and in them it is advantageously resorted to. Some surgeons lay no restriction whatever upon the use of anæsthetics, but a distinction, according to cases, is certainly judicious, and often unavoidable.

Position of the Patient; Method of Operating.—The posture is supine, near the edge of a bed, or sitting on a chair which has a movable back, or may be tilted backwards to any required angle. The head and shoulders are somewhat raised, and the thighs held apart by two assistants, the pelvis being elevated by a cushion. Six or eight ounces of tepid fluid¹ must be thrown into the bladder previously to using the lithotrite,² unless the urine has been allowed to collect for some time. The crushing instrument, well warmed and oiled, is passed just as a common sound or catheter, with great care and gentleness, and search is made for the stone, unless it be struck at once, as often happens. Resting the instrument against the bottom of the bladder, with very gentle pressure, the sliding blade is withdrawn slowly; and a little dexterity, by a turning movement of the handle, will engage the stone within the blades, which are then to be closed. Assuring himself that the calculus *only* is held by the jaws of the instrument, the operator turns the forcing-screw at the handle with his right hand, maintaining the instrument in position with his left. According to the size and consistence of the concretion, will be the amount of force requisite. Often, several pieces require separate seizure and crushing, after the first fracture is effected.

The next step, after crushing any portion of stone remaining within the jaws of the instrument, is carefully to withdraw the latter, firmly closed. The urine is then to be voluntarily voided, and the bladder subsequently injected repeatedly with tepid water, to wash out very thoroughly all the fragments possible. A short catheter, with large apertures, should be used.

¹ Water, generally; the French also use mucilaginous liquids.

² When strong desire to micturate arises, the injection must be stopped.

In cases where any difficulty is apprehended in removing the *detritus*, the value of *position* is great whilst the injected fluid is being evacuated. The erect posture, or one which allows the body to be slightly bent forwards, is best. Mr. Thompson, referring to these cases in connection with enlarged prostate, advises that the patient lean forwards, resting his hands against the wall of the room, or against a mantel-piece, thus allowing the body to describe, by its axis, an angle of 60° with the ground. This position may be easily maintained for several minutes. Two forms of couch are also represented in this author's work (*Enlarged Prostate*, London, 1858), which answer the double purpose of affording a reclining surface during the crushing of the stone, and, when the evacuation of the *detritus* is attempted, of giving a good assistant posture, by merely having the patient turned upon his face, an aperture being made through the bottom of the couch, which can be exposed by slipping out a cushion. By means of a flexible tube fastened to the catheter, an injection is thrown into the bladder, and the evacuation of the contents of the viscus takes place into a vessel beneath the patient. (*Op. cit.*, p. 301.)

Solvents of the fragments are also mentioned, and constitute an important means. Enough *detritus* can be secured by the "scoop-lithotrite" to determine the character of the concretion; when reagents, suitable to the disintegration or dissolution of the pieces, may be used. Besides dissolving fine *detritus*, any excess of alkalinity of the urine may be annulled; and pain is often alleviated by the introduction of solvents—the angles and protuberances of the fragments being rounded off by their action.

Mr. Thompson's work contains excellent representations of a vesical injecting instrument; and he also describes Sir Philip Crampton's exhausting apparatus, which has proved very efficient. It was successfully used in the case of a man of seventy-one, "who had paralysis of the bladder, with immense prostate, urine mucopurulent and bloody, and a stone two inches in diameter." Six sittings freed the patient from every vestige of the stone, and there was no return of the affection during the three remaining years of his life. Engravings of Sir P. Crampton's apparatus and of Hueteloup's "evacuating catheter" are given in connection with the description referred to. The first is preferably employed a day or two after the crushing of the stone, rather than at the time of operating.

It may be added that Mr. Thompson, as well as many others, considers the existence of irritability of the prostate, as well as of the bladder, a contra-indication to lithotripsy. If, however, there be no renal complication, a suitable preparatory course may enable the surgeon to operate.

The wisdom of not rendering the patient insensible by anæsthetics is evident, from the fact that even slight injuries by instruments are followed by much trouble; of course, no intimation of pain being given by patients in a state of anæsthesia, we lose this valuable criterion for the continuance or arrest of the operation. The rule should be to desist when pain is very decidedly felt.

The recumbent posture, in bed, under light diet and with a constant supply of diluents, is demanded. Any pain or spasm at the vesical neck must be allayed by a full anodyne. In severe cases, an opiate, both by the mouth and as a suppository, is needed. Fomentations, applied both to the hypogastrium and perinæum, are very soothing.

Should peritonitic symptoms supervene, the usual treatment should be promptly instituted. Local bleeding and counter-irritation, with calomel and opium, fomentations, and, in violent attacks, *general* bleeding, will be called for.

Eight or ten minutes is considered a proper time to continue a single operation. The period may be varied according to circumstances. Instances of painless operation require less scrupulousness as to time and frequency of repetition. A new manipulation should hardly be attempted under a week, or at least five days. Generally, the second operation is well borne, and so are the successive ones. When this is not the case, lithotripsy is not an advisable procedure. "In all cases," says Dr. Gross, referring particularly to the duration of each sitting, "it is a safe rule to be governed by the feelings of the patient."

Instruments.—The original instruments were clumsy, complicated, and inefficient, compared with those most approved at the present day. Civiale's first was in the shape of a canula of silver, eleven inches long and from two and a half to four lines in diameter. Within this was a steel tube, enclosing triple claws capable of expanding and closing upon the calculus; a scale at the outward extremity indicated the amount of expansion attained by the claws, and consequently gave some idea of the size of the stone. The latter being firmly held by the claws, a steel drill, driven by a bow twenty-five

inches long, was then worked against it, to effect perforation. An instrument called *brise-coque*, completed the operation by crushing the perforated stone. This was lithotrity, properly speaking.

Heurteloup's *percussor* was never a favourite, nor very available.¹ The stone being held by an instrument, blows with a hammer were struck upon the latter, acting, through it, upon the concretion.

The London cutler, Mr. Weiss, has the credit of perfecting the instruments now universally adopted. Two pieces of steel, one sliding within the other, down a longitudinal groove, both curving slightly at the vesical end, catheter-wise, but turning more abruptly, and by a shorter bend, compose the best lithotrite.

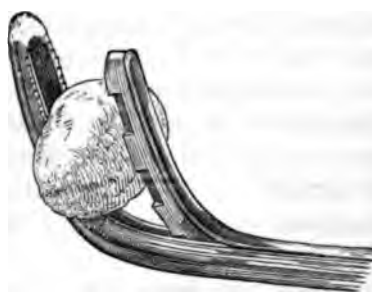
The whole is introduced closed, and when the calculus is seized, pressure is applied by a screw arrangement, propelling the sliding blade along the track of its fellow.

Mr. Elderton first described² an instrument with a curve, for lithotritic purposes; he intended to introduce a sort of *file* and abrade the concretion. In the improved lithotrite of Weiss, of a few years later date, Mr. Oldham made the important addition of a *fenestra* in the outer, convex blade, to give issue to the *detritus* as it accumulates.³

Those who do many lithotritic operations should have several instruments of different size and shape, so as to be prepared for emergencies.

The instrument invented by Dr. Jacobson, of Copenhagen, consists of an articulated chain, working through a silver canula, by means of a steel rod and a stout screw at the top. A graduated scale, as in the other instruments, indicates the volume of the stone. Dr. Gross believes that the objections made against this instrument are unfounded. As respects its greater liability to catch the mucous coat of the bladder, he thinks this need not happen in skilful hands;

Fig. 36.



Calculus seized by the lithotrite. (After Ferguson.)

¹ Some surgeons, however, esteem it very highly.

² Edinburgh Medical Journal, 1819.

³ Coulson.

and that no stone, larger than can be engaged with this, should be attempted, lithontriptically, with any instrument. He has given a good representation of it, as modified by Velpeau. (*Op. cit.* p. 523.)

Mr. Coulson has some invaluable remarks upon the instruments necessary for lithotrity where the prostate is enlarged, in the *Lancet*, January 30th, 1858. Referring to the constant elongation of the urethra in prostatic enlargement, this surgeon insists upon the long lithotrite as well as the long prostatic catheter. He says: "In some of my cases the common instruments were not sufficiently long, and it became necessary to push them up to the shoulder before I could turn the point in the necessary direction." Mr. C. recommends that the beak or curved part of the lithotrite be short, and the curve sharp; also that the lithotrity-couch should have an apparatus for easily raising the pelvis of the patient, so "that the calculus may be displaced towards the posterior wall of the bladder. Especial care must be taken that the pelvis itself be raised, and not merely the lower extremities. By adopting this plan I have on several occasions immediately caught the calculi, which lay concealed behind the prostate as long as the patient retained the ordinary position." Lithotrites of twelve inches length in the stem and one inch and three-eighths in the curve (Charrière); and ten and a half stem, by one and a half beak (Weiss); are recommended by Mr. C. for such cases.

Prognosis; After-Management.—In well-chosen cases, due regard being had to the patient's health, and to the proper performance of the operation, a favourable result may be expected. On the other hand, any rashness in operating, in too quickly repeating operations, maintaining too long sittings, or disregarding inflammatory signs, exposes patients to extreme danger; at best, they will not escape unharmed.

Any of the following accidents, either at the time of, or subsequent to the operation, are very serious:—

Wounding the urethra, either by bruising or tearing its mucous membrane; this may arise from awkwardness, or from using too much force, or such as is ill directed.

Occasionally, a faulty instrument bends or breaks—an occurrence inexcusable on the fabricator's part, if not on that of the surgeon. Serious difficulty and even death have followed such a misfortune.

If large, rough fragments become entangled in the urethral mucous membrane, *laceration* may be produced. It may then be

necessary to dislodge the fragment by a sound, or to extract it by forceps, or otherwise. Retention of urine sometimes follows, from this impaction alone. It is a frequent result of the operation. Unless it arises from blocking of the urethra by clotted blood, or from very obstinate calculous obstruction, it is soon relieved by the usual methods.

There is, very commonly, slight hæmorrhage, and such is productive of no ill effects; if there be profuse bleeding, the recumbent posture, rest, cold applications, astringent and calmative medicines,¹ must be tried.

Rigors very generally follow this operation; sometimes not for several hours. Dr. Gross refers to a collapsed condition which may succeed lithotripsy, and which requires stimulants, morphia, and sinapisms to the spine, extremities, and præcordial region.

That very grave accident, *perforation of the bladder*, justifies the most unfavourable prognosis. Coulson believes that the vesical coats must always be thinned and diseased when perforation occurs. The instrument, or a fragment of the stone, may be the agent. Nothing, essentially remedial, can be done. Typhoidal symptoms generally supervene upon a painful, tympanitic state of the abdomen, and after great agony in the vesical and urethral regions. To quiet the patient by opiates and soothing external applications, is the only course.

Cystitis, following lithotripsy, is always an unfavourable condition; often, indeed, no encouragement can be afforded. Aggravated symptoms, with great abdominal tenderness and feverish excitement, should lead us to fear a fatal result. Usually, the signs of inflammation occur within the first thirty-six hours succeeding the operation.

Vigorous and prompt antiphlogistic measures are demanded. The same treatment is imperatively necessary when *peritonitis* is declared, which, fortunately, is not common. It is considered a more frequent sequence in persons of susceptible, nervous temperament, than in others; and also to be often provoked by too long or too active use of instruments. The small, wiry pulse must not prevent depletory measures. If typhoidal symptoms come on, as is too often the case, the condition is of the gravest description, and scarcely a hope remains for recovery.

¹ Acetate of lead and opium, gallic acid, etc.

There is sometimes *phlebitis*, with *pyohæmia*, or "purulent infection," as some style it. Civiale has found this very rare—only three times in more than four hundred cases. After rigors, usually very violent and persistent, a prostration of the most thorough kind, with delirium and other typhoidal indications, as jactitation, dry tongue, etc., comes on. A fatal prognosis must be given; at all events, there is very little chance for the patient. The *aged* are most frequently the subjects of the affection; broken-down constitutions and dissipated habits predispose to it. Deposition of pus in various organs, and sometimes small abscesses about the cervix vesicæ, pelvic cellular membrane, or peritoneal folds, are found *post-mortem*.

The sinking powers must be sustained to the best of our ability by diffusible stimuli. Quinine and opium are of service, and *mercury* is sometimes recommended. It would seem, however, that but little advantage can be expected from the latter. Our main reliance must be upon the other measures, together with the evacuation of pus, whenever it can be surgically reached.

An instance of *gangrene of the testicle*, a very rare occurrence, is lately reported as following lithotrity, in a patient operated upon by Mr. Stanley, of London. (*Medical Times and Gazette*, October, 1857.) There was, at first, retention of urine, supposed to depend upon entanglement of a piece of calculous matter in the urethra. An angular portion of stone was subsequently voided after some effort and a degree of pain in the prostatic region. Swelling of the prepuce and right testicle supervened. The affection of the latter organ was attributed to irritation of the ejaculatory orifices. Abscess of the gland, with sloughing, next declared itself; and, in detaching a grayish eschar which formed, Mr. Stanley drew out, with it, several yards of the seminiferous ducts. Cataplasms and good diet were ordered, and the man went out of hospital, cured. No attempt was made to remove any remaining portions of calculus. A year subsequently, the patient returned with urgent symptoms of stone. The injured testicle was about two-thirds of the size of the other, and adhered slightly to the cicatrix of the former opening. It was also somewhat softer than the other; but to any one who had not been cognizant of the man's history, it would not, in Mr. Stanley's opinion, have occurred that there had been disease of such serious nature. Possibly, attention would not have been drawn to the part at all.

2. *Lithotomy*.—Cutting for stone takes precedence of all the methods for its removal. First described by Celsus and first performed by Ammonius at Alexandria, the operation of “cutting on the gripe,” as it was termed, or that by the *apparatus minor*, was followed in 1520 by the “Marian method,” or *apparatus major*, planned by John De Romanis, a surgeon of Cremona. Marianus Sanctus, one of his pupils, having described it, the term Marian has been attached to it.

The lesser apparatus was chiefly intended for children; the larger, for adults. Dilatation was the essence of the latter, so far as the membranous and prostatic portions of the urethra were concerned, incision of the external parts being first effected. In the former operation, a semilunar perinæal incision was made (after drawing down the stone by means of the fingers in the rectum), very much as in the bilateral operation of the present day, which latter is referred by Coulson to Le Dran, although generally ascribed to Celsus.

Very little success followed either of these operations. Indeed, a “frightful mortality” is recorded of the *apparatus major*, in the hands of its early practisers. More modern surgeons have done better.

We shall dwell no longer upon the *history*¹ of lithotomy, except to enumerate some of the more famous methods, now either wholly abandoned or modified and merged in others.

One of these is that of Frère Jacques, who, it is said, against much opposition at first, operated on nearly 5000 patients with varying success, but, on the whole, with brilliant results, especially after acquiring a thorough knowledge of the anatomy of the parts concerned in the operation. His was a lateral perinæal operation. Rau, of Leyden, Bamber, and Cheselden, succeeded Jacques as distinguished operators. The two latter adopted the lateral, after having long tried the “high” operation. Cheselden’s “first operation” was very similar to that now practised. He considered his method an improvement upon Rau’s, who had amended the original procedure of Frère Jacques. He filled the bladder with water and cut upon the introduced catheter, admitting a loss of four patients out of ten. Dr. Gross, referring to the account given

¹ See Dr. Gross’ account, to which, and to Mr. Coulson’s work, we owe most of our facts of this description.

by Cheselden, thinks that surgeon incised the antero-lateral part of the bladder, without dividing the prostate gland at all, or only very slightly. There was, by his procedure, an accumulation of urine in the cellular membrane around the rectum, with ulceration and foetid discharge. Drutt and Coulson, however, notice two methods of Cheselden—one being rather a modification of his “first.” In both, it would seem, the prostate was divided; in the original one, its “*whole length*” are Cheselden’s own words; in the second, only the distal edge of the gland was cut, and the membranous portion of the urethra “slit open from behind forwards.” Cheselden is believed to have preferred the latter; the former is essentially the lateral operation now selected as the best when practicable, which it nearly always is.

The practice of Mr. Martineau, a celebrated English lithotomist, was not to divide the whole prostate, but to dilate, with his “particularly long and large forefinger” (Crosse) the undivided portion, and thus afford space to manœuvre with the forceps. He was very successful. The best operators mention the danger incurred by very extensive division of the prostate—as infiltration of urine into the cellular tissue of the pelvis, resulting in inflammation and gangrene, with a nearly inevitable fatal termination—much as is mentioned by Cheselden. Mr. Samuel Cooper, it is said, in common with Martineau and Cheselden, opened the vesical neck rather freely.

Methods now recognized; the Lateral Operation preferable; how performed; Results and After-treatment.—Three different methods, in as many different regions, are now described as the most available. These are, the *high operation*, practised above the pubes; the *recto-vesical* (the term explains itself); the *lateral*, by division of the *cervix vesicæ*, together with a portion of the prostate gland.¹

The first of these necessitates a distended bladder, so that an entrance into it may be effected above the *ossa pubis*. Thickening, irritability, etc., of the bladder render its distension inadvisable. Another procedure is to raise the organ by means of a sound, introduced so as to apply its upper front wall against the pubic region.

¹ The *bilateral* is a nearly related form, less frequently employed; section of the same parts being made on both sides. (See p. 423.)

This operation is not now popular, either in this country or in England. The French have performed it more frequently than any other surgeons.

M. Souberbielle is credited with the largest number of successful cases. One report made by him to the Académie Royale de Médecine, in 1835, announced eleven deaths out of fifty patients operated on; the rest definitively cured; average mortality, one in four and one-half nearly. There was fatal hæmorrhage in one patient, the circumflex iliac artery having been wounded.¹

The operation is suited to very large calculi,² and to those occurring in persons with deformed pelvis, where insufficient space exists for the perinæal section. The objections to it are many and serious. Chief, perhaps, amongst them, should be reckoned *wounding of the peritoneum*, with escape of the small intestines and great liability to urinary extravasation, peritonitis, and death. This train of accidents once occurring to Civiale, he finally opened the perinæum as a safety-valve, thus leading off the urine below, and avoiding the risk of peritoneal inflammation. Recovery ensued. The long and deep incisions required in fat persons, preclude easy manœuvres by this method; nor can a calculus be easily extracted.

When undertaken, the patient should be recumbent, the shoulders somewhat raised, the feet supported. The hair being removed from the pubes, and the line of the bladder ascertained (distension having been effected), an incision three or four inches long is carried upwards from about one-half an inch above the symphysis. The aponeurotic attachment of the external oblique is exposed, and the supra-pubic space being opened, division of the *linea alba* is effected, so far as required, upon a grooved director. The bladder, often lying very deep, and more difficult to reach than would be supposed, is raised and held by a tenaculum, and a probe-pointed knife is introduced, its edge turned upwards by the operator at the lower and front part.³ Two inches is the length advised for the incision of the viscus, the fore and middle fingers of the left hand serving as guides. The stone is then removed by forceps, and a catheter or bougie retained in the wound to prevent urinary accumulation and overflow.

¹ Pye; reported by Carpue.

² And even then, from the frequently thickened and contracted state of the bladder, the lateral operation is preferable.

³ Coulson.

Dr. Noeggerath, of New York, has lately published an account of a successful operation by the high method, and the case presented unusual difficulties, both diagnostically and remedially. Dr. N. believes that epicystotomy is undervalued, and may be done much oftener with good results than has been hitherto admitted by authorities.

His patient had been seen by different physicians and surgeons; the case had been diagnosticated as one of catarrh of the bladder, chronic inflammation of the bladder, etc. It proved, however, to be a calculous case, and a stone so large as to fill the bladder was finally extracted by the supra-pubic section. The report of the case will well repay perusal, and it seems eminently to have been one of the instances to which the high operation is exactly suited. The difficulty in detecting the calculus is an important point in the narration.

The reporter quotes Professor Pitha, of Prague (Virchow's *Handbuch d. Spez. Pathologie*, Erlangen, 1855), as wholly in favour of the high operation in women and children. Gunther is also mentioned by him as advocating it, and likewise Langenbeck, of Berlin. In New York, Professor Willard Parker has revived the operation, and so has M. Souberbielle, in France.

Dr. Noeggerath's very interesting case is published in full, with lithographic representations, in the *New York Journal of Medicine*, for January, 1858.

Recto-vesical Operation.—This originated with M. Sanson, of Paris. The sphincter ani and lower portion of the rectum are first divided, the incision corresponding to the perinæal raphé. Further incision lays bare the bulbous and membranous part of the urethra and exposes the prostate gland and bottom of the bladder. A staff is introduced *per urethram*, and the bladder opened by cutting upon it.

Advantages.—Supposed freedom from troublesome and dangerous hæmorrhage (doubtful frequently); facility for introducing the forceps and extracting the stone.

Objections.—Very possible fistulous communication, of an obstinate nature, between the rectum and bladder. Mr. Coulson mentions a vesico-rectal fistula from an incised wound, and which persisted for years. The *vasa deferentia* and *vesiculæ seminales* may be wounded. Recovery is tedious. The operation is unadvisable even in those cases where the calculus is impacted in the walls of the bladder.¹

¹ Coulson.

The *Bilateral Operation* consists in making an external semilunar incision, the convexity looking upwards, and passing across the perinæum; it is directed between the bulb of the urethra and the anus; the surgeon then opens the membranous portion of the urethra, and passes a narrow knife or a probe-pointed bistoury into the bladder, dividing both sides of the prostate gland. A double *lithotome caché* may be used to divide the prostate, if preferred.

First performed in the United States by Dr. Ashmead, of Philadelphia, in 1832, it is not at present a favourite operation here,

Fig. 37.



Bilateral operation—The external incision.

although it has been frequently performed. Dr. Gross mentions several cases.¹

The Lateral Operation.—This is the operation *par excellence*, by universal consent. It is suited alike to youth, middle life, and old age; to cases of single or multiple calculus; and it is very rarely contra-indicated by deformity of the pelvis or insufficiency of perinæal space.

Preliminary Measures.—A careful and even minute attention to preparing the patient is essential, whatever method be adopted in operating. The greatest success has uniformly attended those who have paid most attention to these details. We should never under-

¹ The *quadrilateral* and *median* operations are described by writers, but their details are unessential. (Vide Gross, *op. cit.*, *et al.*) We shall hereafter refer to one or two other methods, and especially the *mesial*.

take lithotomy without endeavouring sedulously to amend shattered health, to obviate morbid states of the urine, irritability of the bladder, and disorder of the intestinal functions. The rectum must be previously well cleared of accumulation. Mr. Coulson directs a few grains of *hydrargyrum cum cretâ* with powdered rhubarb, on the night before the operation, and castor oil the next morning, followed by two clysters; one, two or three hours after the oil, and the second, about one hour before operating; the latter, of gruel, and to contain twenty or thirty drops of laudanum. He is particular to have the last enema pass off prior to beginning. Tepid water and salt has also been advised, to clear the lower bowel.

Fig. 38.



Fillet for binding Patients during Lithotomy. (After FER-
GUSSON.)

So far as may be, the patient's mind should be calmed, and a hopeful view of his case imparted.

Position of the Patient.—Supine; on a table about two feet and a half from the ground;¹ the head and shoulders slightly raised by pillows; the patient being directed to grasp each of his feet with the corresponding hand, is bound in that position with broad worsted bands;² the breech is brought a little over the edge of the table, so as to be wholly at the command of the operator. The patient is now ready for etherization.³ If alarmed at, or averse to being tied, and anæsthesia is intended, he may be bound after that process, but preferably before. The surgeon should carefully supervise the binding.

First Step: Introduction of the Staff.—This instrument is of steel, catheter-shaped, about ten inches long without the handle; the latter being about two inches long by fifteen lines in width, and two and

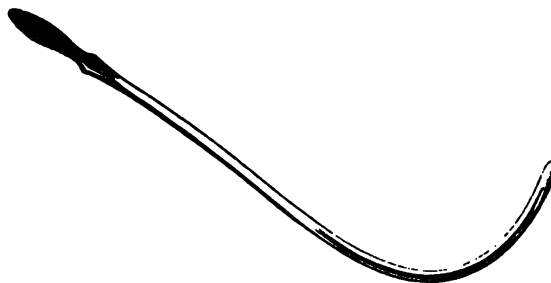
¹ Coulson.

² Many surgeons say that the staff should be introduced previous to binding the patient. This is Mr. Coulson's advice, and his reason is that the instrument is easily passed when the thighs are brought upwards and flexed upon the abdomen. Dr. Gross adopts exactly the opposite procedure, to avoid the escape of urine, provoked by the passing of the staff. He also refers to the needless annoyance thus caused to the patient, and the embarrassment to those who manage the limbs. Others have made similar objections. It seems to us that, as it is very possible to pass the staff after tying the patient, the procedure is both more direct and far less troublesome.

³ We observe that Dr. Gross makes no reference to the use of *ether*, when anæsthesia is required; it is constantly *chloroform*.

a half lines thick, and roughened so as to afford a secure hold. It is to be carefully introduced, much as a catheter. A *competent* assistant should take charge of it, for it is well said, "A poor staff-holder is a great curse."¹

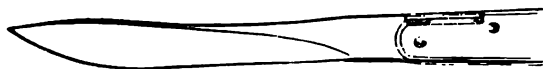
Fig. 39.



Lithotomy staff.

Mr. Coulson directs the handle to be "inclined a little towards the ground." His reason for this is, that, although he gets less prominence from it in the perinæum, its position does not require altering, when the knife has entered its groove; the left forefinger is also left free to protect the rectum and guide the knife. More rapidity is ensured if the surgeon can get rid of holding the staff. Slight turning of the staff to the *left* side is to be practised, when the groove is directly in front.² A somewhat different plan is followed by other surgeons. The staff being held perpendicularly, its handle nearly at a right angle with the body, is turned slightly towards the *right* side. The hook of the curved part rests against the *symphysis pubis*. Thus the rectum is guarded from pressure and wound. The inclination of the sound to the right groin tends to make the perinæum bulge on the left, and affords a mark for the knife, to divide the membranous part of the urethra. The assist-

Fig. 40.



Liston's lithotomy knife.

ant stands on the patient's left side, and with his right hand holds the staff, whilst he draws up the scrotum with the left.

¹ Gross.² Coulson.

Second Step: Incisions; Position of the Surgeon.—When about cut, the operator sits on a low, strong chair, or rests upon his right knee, the other foot supporting most of the body.¹ The latter p

Fig. 41.



Lateral operation—Direction of external incision. (FERGUSON.)

sition affords much freedom to the hands and arms, and brings them nearly on a level with the patient's pelvis.

Fig. 42.



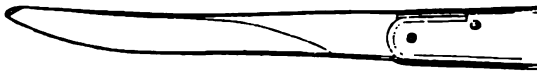
Lateral operation; cutting upon the staff. (FERGUSON.)

The first incision is commenced low down, about two fingers breadth from the anus. Coulson endeavours not to alter the relation of the parts by any pressure, in order to make the staff pro

¹ Gross.

minent. He easily finds the latter, and does not take it as a guide to his first incision. Having introduced the index finger of the left hand, oiled, into the rectum, thereby causing it to contract, and also enabling the surgeon to feel the staff, and beginning at the left of the *raphé*, at the above named distance¹ from the anus, the integuments are divided nearly to the *tuber ischii* (Coulson); or, as has been recommended, just beyond it (Gross); deeper division, through the fat and cellular tissue, exposes the membranous portion of the urethra, which is opened and allows the groove of the staff to be felt. These incisions, and the subsequent division of the bladder, are by many effected with one knife. Mr. Coulson first employs a common scalpel, then a long, straight

Fig. 43.



Lithotomy knife.

knife, with a knob on it, for incising the bladder. It seems not only more simple, but very desirable, on many grounds, to employ but one knife. After the external incisions, the knife is re-introduced, and the membranous portion of the urethra cut into on the line of the groove in the staff to the extent of one-third of an inch. Next, the vesical neck and the left lobe of the prostate are divided obliquely downwards and outwards, the rectum being held down by the left index finger, which should be kept at the bottom of the wound from the first. (Gross.) The single *lithotome caché* is preferred by some surgeons to the knife for the latter incisions.

The bladder being opened, the urine forcibly escapes, often bringing the calculus down to the wound; the surgeon's finger resting against the staff (the knife being withdrawn) is easily passed into the bladder, and an examination of the stone made. If it be very large, more or less dilatation of the wound is requisite; the prostate may be

Fig. 44.



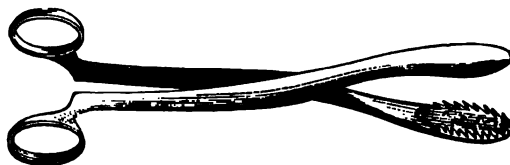
Single lithotome caché.

¹ About an inch (Coulson); one inch and one-fourth (Gross).

caused to yield by the finger,¹ but the knife will be needed for the other structures.

Third Step: Introduction of the Forceps and Extraction of the Stone.—The forceps, closed, are to be passed into the bladder, and above the index finger, which rests upon the stone; when they touch the

Fig. 45.



Lithotomy forceps.

latter, their blades are to be carefully expanded over it, and, firmly enclosing it, if possible at first by its long axis, being careful not to pinch the vesical mucous membrane, efforts at extraction, much as with obstetric forceps, are to be gently made. Should the stone be near the wound,² it is usually easily seized, and, if not very large, extraction is not difficult. If situated far back, towards the fundus, a finger in the rectum will assist in bringing it down, so that the forceps can reach it.³ Careful exploration by the forceps is sometimes necessary, for some time, in order to determine the exact position of the concretion. It may lie high up behind the

¹ Except in old persons, when its indurated state may necessitate the use of a probe-pointed bistoury.

² Mr. Fergusson is sometimes in the habit of catching it in the forceps as pushed into them by the urine.

³ Dr. Shortliff, of Malaga, lately did the lateral operation for stone upon a boy 14 years old, whose perinæum is stated to have been rather fat. After the incisions, the stone could be touched by the finger and reached with the forceps, but not sufficiently to grasp and extract it. "Different forceps and different manipulations were used, but all without effect." The patient was finally sent to bed with the stone still in the bladder. He subsequently had a serious attack of bronchitis, and no further attempt was made at extraction of the calculus. An elastic tube was left in the wound. On the fourth day after the operation, the boy's mother took away the stone with her fingers from between the lips of the wound; the patient having noticed a sensation as of "something strange" there. The calculus was phosphatic, one inch and a half long by one and a quarter in circumference at the thickest part. Recovery was complete.

A spasmodic contraction of the vesical muscular fibres, or else sacculation was supposed causative of the difficulty in seizing the stone. Dr. S. had operated twenty-five times by the lateral operation; in all but one successfully. He never before failed to extract the stone at the time of operating. (*Lancet*, December 12th, 1857.)

symphysis pubis; pressure in the lower hypogastric region will probably then dislodge it.

The *scoop* is often easily and effectively used if the calculus be small enough to be extruded by it. Fragments of calculi, or

Fig. 46.



The scoop.

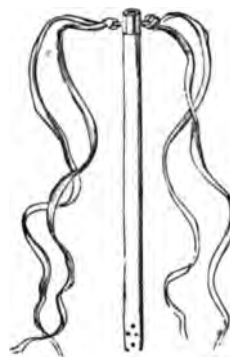
adherent, encysted, and impacted stones¹ are also thus conveniently removed. Pressure, by means of a finger in the rectum, and change of the patient's position, will assist the surgeon.

Fourth Step: Completion.—Having removed the stone, the bladder is to be thoroughly washed out by means of a large syringe, and every care taken to ensure the complete evacuation of accidental fragments or small, unbroken concretions. The patient is now released from bondage and put to bed, with something placed beneath him as a guard against the flow of the urine.

Druitt and others refer to the method of Dr. Nott, of Mobile, by injecting the bladder of a lithotomized patient, through a large-sized catheter, with tepid water. The patient sits over a urinal, and the stream flows freely, washing out the organ very thoroughly.

After Management.—Lying upon the back with the shoulders slightly raised, the patient's person is to be kept as clean as possible;² and, as intimated, the bed should be guarded with oil or India-rubber cloth. A large gum-elastic catheter, or a canula, is introduced into the bladder through the wound, and draws off most of the urine. If blocked by coagula, these must be removed by the surgeon's finger. Anodynes are generally needed; often a large dose of opium or morphia³ is imperatively required, and the bowels should be rendered soluble; castor oil is usually

Fig. 47.



Canula for drawing off urine.

¹ Gross.

² Any thin phosphatic concretion forming about the wound should be annulled by nitric acid lotion (four drops of acid to 3j of water); and the nitric acid may be given internally. Dr. Gross objects to leaving a canula in the wound. Others advise it.

³ When the pain is very severe, the object should be to conquer it at once. A grain of morphia may be given in such cases. (Gross.)

given; but no action of the bowels should be solicited for two or three days. Light diet, demulcent drinks, and quietude for the plethoric and strong, sometimes tonics and stimulants for the feeble, will be requisite. The most careful discrimination of the practitioner will be demanded.

Prognosis.—If the patient be in good condition when operated upon, and there is no complicating disease or untoward result from accidents occurring during, or immediately after the operation, we may augur a successful termination. "In favourable cases, the urine begins to flow by the urethra in about one week, and the wound heals completely in four or five." (Druitt.)

A late instance of lithotomy, showing the immediate beneficial effects of the operation, was reported to the Boston Society for Medical Improvement, January 25th, 1858, by Dr. Henry J. Bigelow. The patient was a man thirty years old, greatly emaciated. The pain he endured was paroxysmal in its nature, and very severe. When out of bed, he was obliged to maintain a bent posture. He was confined to his bed for some time previous to the operation. The lateral operation was successfully performed, and a large phosphatic calculus removed. Its weight was three ounces and three-quarters. Between four and five weeks after the operation, the patient *had gained twenty-five pounds*. He returned home well. The following cut represents the actual size and shape of the stone.

Fig. 48.



Children do better than adults, and especially than old persons. It is generally believed that those patients who have been most carefully prepared for the operation do best. This is doubtless true, unless there is the *nimia cura*; over-attention would only

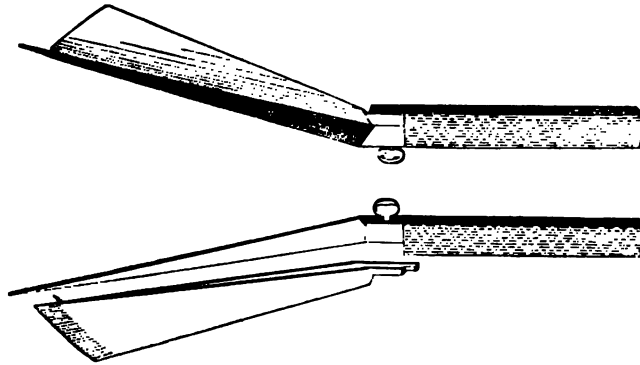
render a patient more susceptible. All proper precaution, however, should never be omitted. Doubtless many lives have been sacrificed to neglect in this respect, and to refractoriness, or foolish exposure by the patients themselves.

As for the influence of "sheer luck," as Dr. Gross terms it, the expression is altogether wanting in significance. Luck does not make a bad operator a good one, although the patient of the former may recover, while the latter loses his. Many inappreciable circumstances affect the result, after the best operation. What is thus termed "luck," is rather the intervention of Providence, through either recognizable or undiscovered agencies.

The occurrence of any of the following accidental complications more or less aggravates the patient's condition after lithotomy.

Accidents resulting from the Operation; their Management.—Violent hæmorrhage may happen. It may be arterial or venous, and occur during, or not till some time after the operation. A few ounces of blood (three to six usually) follow the incisions in most cases; more than this would exhaust a feeble person, whilst it might, if restrained at the right time, rather benefit a plethoric one. Death from bleeding after the lateral operation is infrequent, when the latter is done with the knife. The *gorget* has been much oftener accused of

Fig. 49.



The gorget.

producing dangerous hæmorrhage. This instrument seems now nearly, if not quite, ostracized—and, it would seem, very properly. M. Bégin asserts that one out of every twenty or twenty-four patients operated on by the lateral method dies from loss of blood; but others maintain this to be altogether an exaggerated estimate.

The sources of the bleeding are usually the artery of the urethral bulb and the superficial perinæal artery. Sometimes, in the aged, obstinate bleeding from the vesical neck and the prostate takes place. The transverse perinæal artery is sometimes wounded, and the pudic has also been touched by distinguished surgeons. Any anomalous arrangement of the perinæal vessels subjects the patient to the risk of bleeding; and such a deviation from the usual distribution is by no means uncommon.¹ Fungous growths, unrecognized before operating, may sometimes furnish the blood; and certain patients may possess the hæmorrhagic diathesis; in which case they *ought not* to be operated upon—when it is not easy to arrest the blood, as in deep incisions—for they are especially in danger.

Hæmorrhage, when excessive or troublesome, is to be met by the ligature; by twisting of a vessel which can be seized; pressure when applicable; astringent, styptic, and cold applications. The latter should be resorted to only in desperate cases. To close a wounded pudic artery, Physick's forceps are admirably suited. Compression is difficult; it necessitates the introduction of a canula, sponge, lint, etc.; is not so sure as a ligature, when that can be applied; and, when relied upon, must be carefully managed and watched. Dr. Gross, in a remarkably complete *résumé* of means for arresting the flow of blood, mentions a pair of compressing forceps, "slender, delicate, with moderately sharp teeth, and a slide for closing the handles." These, well figured, with many other instruments, in his large volume, seem admirably adapted to the purpose they are intended to fulfil.

Secondary hæmorrhage, a very serious accident, must be promptly dealt with. Coagula are to be at once removed, and the injured vessel closed by a ligature, if possible; or else unremitting compression maintained, together with cold irrigation. Death from hæmorrhage, after the lateral operation, is uncommon at the present day.²

Collapse is infrequent in modern times, not only because the knife is more accurately used, and there is less tearing, pulling, grinding, bruising, and wholesale torturing of the patient than was indulged in by the early lithotomists, but in consequence of the

¹ Boyer. Gross.

² Mr. Coulson remarks the benefit sometimes derived from a dose of opium in aged patients. He also advises ice to the perinæum.

shock to the system being greatly diminished by etherization. Occasionally, however, there is violent shock from unavoidably long, severe, and difficult operative measures, or from profuse bleeding.

Such patients are liable to die, either on the operating-table or soon after removal from it, when excessive sinking takes place and is not promptly relieved. The usual remedies in analogous cases are to be instantly and perseveringly employed. The patient is to be laid upon his back, as if in a fainting-fit: stimulants are to be administered (brandy, ammonia, etc.), and aromatics applied to the nostrils. Stimulating *enemata* and mustard-plasters to the feet, or frictions with mustard-water, should be tried. As inordinate reaction may follow, the surgeon should watch his patient closely.

Excessive Inflammation of the Wound; Cystitis; Phlebitis; Tetanus.—These states are of course highly unfavourable, especially if the wound suppurate profusely, become erysipelatous, or tend to gangrene. The neighbouring organs may be affected, and grave constitutional disturbance is nearly sure. So, if the bladder fall into chronic inflammation accompanied by ammoniacal urine, or if there be acute inflammation, the complication is a most trying one. The treatment will not differ from that previously detailed for cystitis, in any essential particulars. A gangrenous condition of the wound is treated by weak chlorinated or nitric acid solutions applied by a syringe.*

Phlebitis sometimes occurs. It seems to be infrequent in the United States, and also in England, but very common in France. Dr. Gross records several interesting and important cases of this sequence of lithotomy, from accounts by different surgeons, and also gives a fatal instance from his own practice; the patient was a boy of 8 years, who had, after the lateral operation, phlebotic abscesses in the kidneys.

When phlebitis is first manifested in the extremities, leeches, fomentations, blisters and iodine are locally applied, and incisions will doubtless be always needed. The systemic state requires large

* Mr. Allarton (*Lithotomy Simplified*, London, 1854) dispenses with anæsthetics altogether, on the ground that the patient should aid the surgeon by *propulsive efforts*. For this he is somewhat *scarified* by the *Lancet* (May 12th, 1855). Both pain and a certain amount of danger being avoided by anæsthesia, the surgeon ought to use it. In *lithotrity* it is different.

† Gross, *et al.*

and repeated stimulation. Opium and quinine are also often demanded, whilst all depletory measures are out of place. No one would think of giving mercurials, unless there were great vitiation of the secretions.

If the patient recover, he must be early subjected to the best hygienic conditions; taking the air freely, and having his strength judiciously elevated by good, nourishing food. The affected limb must be supported by suitable bandages.

Tetanus has been noted as an occasional effect of the operation. It must be very rare.¹ A hot climate would probably favour the occurrence of this accident. Anæsthesia should be resorted to, if there be threatening symptoms; also anodynes and sufficient stimulus to keep up the strength.

Retention, Infiltration and Incontinence of Urine as Sequelæ.—These are most unfortunate complications, especially the latter two. *Retention* arises either obstructively, from coagula or swelling of the lips of the wound, or from urethral spasm. The catheter may be cautiously introduced, and simple or anodyne fomentations will usually relieve any irritable or spasmodic condition.

If there has been hæmorrhage, a canula left in the wound will both lead off the urine and tend to compress any bleeding vessels.²

Infiltration of urine, to any great extent, is usually fatal. Peritonitic symptoms, with great subsequent prostration, and a general typhoidal state, rapidly supervene. There is then inflammation, suppurative discharge, gangrene of the parts, and of the pelvic cellular tissue. Depletory measures are usually inadmissible; we direct hot, soothing fomentations; evacuation of the extravasated urine by incisions; free exit to be given to it from the bladder by catheterism—a gum-elastic instrument being retained in the organ. The strength is to be maintained, if possible, by nutriment and stimuli. Many ascribe infiltration, in most cases, to a too free division of the prostate gland.

Incontinence of urine is either partial or complete; may be excited by great bruising or stretching of the vesical neck, either by instruments or calculi; is not a common accident, and is treated by rest, soothing enemata, pressure on the perinæum by a T truss, etc. Cauterization of the vesical neck is sometimes requisite. The in-

¹ Dr. Gross never saw it. He reports two cases out of twenty-two, from Mr. Brett, of Calcutta.

² Gross.

ternal remedies are demulcents, and, in obstinate cases, the tincture of the muriate of iron, strychnine, cantharides and alkalies.

Peritonitis.—This is infrequent, except as a consequence of extravasation of urine and diffuse inflammation of the cellular tissue.¹

The affection is always exceedingly grave and difficult to treat; especially as after lithotomy we can rarely deplete freely, or generally, with safety. Leeches may be used, and calomel and opium tried; of the former medicine, from three to five grains, with two, three, or even four of the latter, every four, five, or six hours. Full and continued doses of opium are much relied upon. Fomentations of a soothing nature, as those with infusion of opium, hops, or poppy-capsules, and sometimes vesication of the entire abdomen,² are advisable.

The *supra-pubic* operation is thought to be more obnoxious to peritonitic attacks than any form of the perinæal method. There is certainly more danger of urinous infiltration from it. Peritonitic inflammatory traces are observed *post-mortem*, and frequently those of cystitis are simultaneously remarked. Life is rarely prolonged after the third or fourth day. The attack generally comes on within the first two days.

Impotence is spoken of as common by certain authorities. The seminal ducts are usually unharmed, the prostate being divided externally to them; the accident must therefore be rare.

The case of impotence reported by Bérard arose from the semen passing off into the rectum by a urethro-rectal fistula. Mr. Coulson believes there is "more imaginary than real" impotence after the operation. At all events, he has operated upon many children who afterwards manifested sufficient potency of the virile functions, being some of them married and fathers.

Perinæal Fistula.—The average stated time for closure of the wound after perinæal section is from three to four weeks; the incision may not entirely heal, a *fistula* remaining; sometimes only a minute opening is left. Ulceration, sloughing, or impaction of a fragment of stone, or sand, causes it. Drops of urine, exuding, declare it. It is treated by retaining a catheter in the bladder and cauterizing the neck of the latter with nitrate of silver. A heated probe is sometimes passed into a small fistula. The recumbent posture must be directed, and all foreign bodies carefully removed from the parts.

¹ Mr. Crosse.

² Gross.

Wound and Sloughing of the Rectum. Injury to the Prostate Gland.—A wound is not often inflicted upon the *rectum*; when done, it usually heals simultaneously with that in the *perinæum*. Sometimes recto-vesical fistula remains in adults; there is rarely any trouble with children.¹ Sloughing of the rectum is an occasional mishap. The sickly and feeble, or those exposed to erysipelatous contact, and especially if in crowded hospitals, are most frequently the victims. Injury by the knife, forceps, or stone, and extravasation of urine, are the direct causes. Very often, by means of scrupulous cleanliness, detergent solutions (such as that of soda or the nitric-acid lotion), and by maintaining the strength of patients, permanent recovery takes place.

Lacerations, unnecessary cutting or bruising of the *prostate*, either by the instruments employed, or by the stone as it is withdrawn, although not frequent in careful hands, yet occur. Jammed portions, if possible, must be cleanly cut away; the wound, being then simple, will readily heal; the other might slough. The usual antiphlogistic measures are to be put in force against threatened inflammation.

Relapse.—We have no data by which to determine the frequency of relapse. If the operation be done with proper care, no fragments will be left to form nuclei for new concretions. Much, of course, depends upon the presence of any particular diathesis.

Phosphatic calculi are more prone to return than others. All serious disease of the related organs, and disturbances of the digestive functions, predispose to recurrence.

Very careful examination of the bladder at the time of cutting, and shortly afterwards, if there be the least doubt, and also frequent observations of the urine, should be made; the latter especially with the view of discovering the large "organic globules" (exudation-corpuscles) of Bird, to which attention is directed on account of their being considered indicative of the existence of calculus.²

There are numerous instances on record of multiple operations upon the same individual, and some were done at remarkably short intervals. Dupuytren is said to have cut for stone *twice within three days*, and the Coopers three times within four years. In an instance where the operation became again necessary from neglect to entirely clear the bladder of calculi at the first trial, it was done

¹ Coulson.

² Alluded to by Coulson.

three times within a few weeks.¹ Sacculation of the bladder at its fundus, and great enlargement of the middle lobe of the prostate, were the causes of failure in removing all the calculi. Death shortly followed the third operation.

Extraordinary numbers of calculi have been taken from the bladder by lithotomy. Professor Eve (*Surgical Cases*) has recorded several examples. Thus, Dr. Physick's operation upon Chief Justice Marshall relieved him of "*over one thousand*;" Dr. Eve himself took away one hundred and seventeen. Two hundred and sixteen were found in the bladder of an old man, *post-mortem*, by Dr. J. Kelly, of Esperance, N. Y. (Eve, *Boston Med. and Surg. Journal*, 1852.)

Certain Methods not yet Presented.—Mr. Allarton (*op. supra cit.*) renounces the lateral for a mesial method. It is a procedure closely simulating the Marian, but somewhat more simple; otherwise it surely would not deserve the designation "Lithotomy Simplified." There is such a thing as too far simplifying an operation; and again, there are modifications which profess to simplify, but scarcely succeed. It does not appear that Mr. Allarton uses any fewer instruments than are now employed by good lithotomists to do the lateral operation. In fact, his "long, ball-pointed probe or wire" introduced along the groove of the staff, which latter is then withdrawn, is something additional. The *Lancet* for May 12th, 1855, refers, in connection with its notice of Mr. A.'s book, to the similarity between his and De Borsa's method.² The latter consists in an incision from the bulb to the prostate, sometimes unavoidably scarifying this gland when more than usually thrown forwards. The entire membranous portion of the urethra is opened by a double-edged scalpel, the left forefinger passed into the wound and along the groove of the staff into the bladder; dilatation is effected by a semi-rotatory movement, and the stone extracted by forceps. It is stated that De Borsa, and Manzoni of Verona, only lost one patient from a hundred of their collective cases treated by this method. The fatal case was charged to influences outside of the operation. Such success, if we accept the report, is certainly most unusual.

The great objection to this sort of operation is the liability to

¹ Case of Judge Sprigg; reported by Dr. Gross. (*Op. cit.*, p. 614.)

² Bresciani de Borsa, an Italian surgeon.

subsequent trouble from the forced dilatation requisite; bruising of the urethral tract, the prostate, etc., healing far less readily than clean incision. Mr. Allarton gives numerous reasons for preferring the median to the lateral operation; the principal are "the impossibility of missing the bladder; the smaller amount of cutting; the neck of the bladder being uninjured; the urine being at once passed by the urethra, as well as by the wound;" greater facility in reaching the stone, and in crushing it, if necessary; less danger of urinary infiltration, and of wounding important vessels; none (according to Mr. A.) of touching the rectum; quick recovery; ease with which the operation may be done. With regard to the latter, the reviewer before cited remarks that he should apprehend,¹ "1st. A too extensive division of the membranous portion of the urethra; 2dly. Slipping of the knife into the rectum; 3dly. Rough and too rapid digital examination; 4thly. Tearing of the membranous urethra by the forceps or the stone." In a subsequent number, the critic somewhat modifies his strictures.

Dr. Andrew Buchanan, of Glasgow, Scotland, is another staunch defender of mesial operations, and, in a well-written paper of sixteen pages, read in 1847 (Sept. 7th) before the Medico-Chirurgical Society of Glasgow,² gives an ingenious and clear exposition of his views. The chief peculiarity, perhaps, in the method he proposes, is the *form of the staff*,³ which is rectangular for three inches from its lower end. "When this staff is introduced into the bladder, the lower or grooved branch of it lies parallel to the rectum, the angle resting on the farthest extremity of the membranous, or rather the commencement of the prostatic, part of the urethra, so that, when the knife is plunged into the groove of the staff, the membranous part of the canal escapes all injury, the incision commencing at the apex of the prostate gland, and being continued along the side of it to the bladder." (Buchanan, *loc. cit.*, p. 7.) After trying several grooves, this surgeon adopted one which is lateral and has "a posterior opening, so that the point of the knife might

¹ Not at the hands of Mr. Allarton, to whom he awards all due praise, but in unused or less skilful ones. The instrument devised by Mr. A. for cutting safely and surely into the groove of the staff is highly commended.

² Published in 1848 by Sutherland and Knox, of Edinburgh, entitled *On Lithotomy as Performed with a Rectangular Staff*.

³ The writer brought Buchanan's *staff* and *knife* from Scotland in 1850, and has exhibited them to surgeons here. He is not aware that they have been used here.

pass directly into it from the perinæum." We need not describe the operation, but would refer to the printed account and report of three very successful cases as well worthy of attention. Dr. Buchanan believes mesial operations to be "more direct, and more easy and rapid of performance," than either the common lateral or the bilateral. This is undoubtedly true, and yet surgeons cling tenaciously to the lateral. He remarks: "The common object of all these operations is to reach the apex of the prostate gland, in order to incise it. Now, I would ask if this is not done in the most direct and natural way in the operations described above (his own)? The point of the prostate is not above two lines distant from the posterior extremity of the raphé of the perinæum, and, by merely piercing the skin and fibres of the sphincter muscle, the knife comes immediately into contact with it, and, entering the groove of the staff, cuts one side of the gland as it goes along into the bladder." He likens the "circuitous route" by which the prostate is reached in the lateral operation, to the course of a person who, "in going into his own house, instead of opening the door to get into the passage behind," makes "a breach in the wall to the right hand, and, getting into the adjoining apartment," goes "thence through the intervening partition, taking care, however, to penetrate through the partition near the roof, so that he may descend into the passage from above." (*Loc. cit.*) He, as well as Mr. Allarton, thinks that the rectum is less likely to be wounded in mesial than in lateral operations; also that there is less likelihood of hæmorrhage.¹

Mr. Joseph Sampson Gamgee,² in some remarks upon the Relative Merits of Lithotomy and Lithotrity, with Observations on the Neapolitan or Modified Method of Moreau for Lateralized Litho-

¹ The editor of the *Gazette Médicale de Paris* (December 5th, 1857) cites M. Petrequin (*Anat. Chirurg.*, 1857, p. 432) adversely to the median operation as follows: "This method attacks the prostate but slightly; in order to avoid the rectum, only about seven lines of the gland are divided, which allows of an aperture too small for the issue of calculi. If the rectum be wounded, there is the risk of incurable fistula, and, in *infants*, the danger of injuring the peritonæal cul-de-sac, which, descending very low, comes almost immediately beneath the bistoury."

The editor considers the above as summing up the perils of the median operation, especially in children. A case by Dr. King, from the *Edinburgh Medical Journal*, and which terminated favourably, is quoted in this connection. The operation would seem especially suited to cases of moderate sized calculi.

² *Researches in Pathological Anatomy and Clinical Surgery, etc.* London, 1856.

tomy, states some interesting facts. He alludes to the great success of the operation, generally, in Italy—particularly at Naples. Dupuytren noticed this when there to repair his health. Mr. Gamgee witnessed it in 1854. The rate of mortality is five to ten *per centum*, for a *maximum*, in the great Neapolitan hospital. Nearly all the patients are lithotomized, lithotrity not being in great repute. Out of forty-three patients lithotomized in 1853 in the above hospital, there was only *one* death, and that not immediately connected with the operation or its sequelæ. The lateral operation, with certain modifications, is that selected. The ordinary grooved staff is used; its curve is made to be readily felt beneath the integuments, the latter being rendered tense by its pressure. In the majority of cases, the prostate can be felt in front of the anus, and its anterior edge, even, defined, so as to furnish a very valuable guide. External incisions, down to the staff, are made as in the ordinary lateral method, the staff being constantly pressed towards the wound. In the upper angle of the latter, the right index finger detects the anterior edge of the prostate; the point of the knife¹ pierces the membranous urethra a little in front of that edge, and now the surgeon's two hands must co-operate; with the left, the handle of the staff is carried upwards towards the middle line, and backwards; thus its concavity becomes more distant from the rectum as it approaches the pubis, and the point is pushed farther on into the bladder. Simultaneously, the right hand being raised and impelled forwards, the point of the knife is (having been, from the first, pressed against the groove of the staff) slid along the groove into the bladder. The blade, being long and narrow, only notches the anterior edge of the prostate and its urethral surface, in its passage onwards. The point of the knife having entered the bladder, the prostatic incision is completed by fixing the back of the knife against the staff, and carrying its point downwards and to the left, in the direction of the inferior oblique axis of the prostate, the one commonly divided. The knife is now withdrawn, without cutting, in the same direction in which it was introduced. "The maxim is, to make the prostatic incision as small as is consistent with the safe extraction of the calculus." It is enjoined that the fibrous ring at the base of the prostate gland be preserved intact.

¹ Here the Neapolitan surgeons exchange the ordinary scalpel for one cutting only for an inch from its extremity. Gamgee (*op. cit.*).

With regard to the relative merits of the two operations, lithotomy and lithotrity, Mr. Gamgee wholly opposes the latter, and rather doubts the deductions of Sir Benjamin Brodie, published in the *London Lancet* (March 24th, 1855), in favour of that operation. He adduces the precisely opposite conclusions of Mr. Syme at nearly the same date (May 26th, 1855). The local and constitutional irritation; number of manœuvres; difficult expulsion of fragments; their impaction; frequent cystitis; occasional, though rare urinary infiltration and purulent infection, with the liability of reconstruction of the stone; are Mr. Gamgee's, as they are the usual, objections to lithotrity. He believes it will only be regarded as a useful auxiliary in the treatment of an aggregate of cases of vesical calculus; that it is much more serious than its eulogists allow; and that lithotomy is far less dangerous than would be imagined, when the cutting through such important structures is considered.

Rau's statement, that he lost no patients out of 1,547 lithotomized, Gamgee regards as "fabulous," and believes that his (Rau's) love of truth was second to his love of self-glorification.

The above-described Neapolitan method is almost literally that of Moreau;¹ the *vesical neck*, however, is left intact by the Italian surgeons—an important point.

Whilst treating of the different methods of performing lithotomy, we may refer to an account preserved by Professor Eve, in his late collection entitled "*Remarkable Cases in Surgery*." This is an instance of lithotomy by a surgeon *upon himself*; and it is so "remarkable," both as respects the astonishing coolness and dexterity displayed by the operator, and for its wholly successful result, that we consider ourselves justified in transferring it to these pages, entire.

The account is furnished by the surgeon himself, and was published in the *Lancet*, vol. v.—vi.

"Fixed in my resolution, after having made the necessary preparations, I placed myself before a looking-glass; I raised the scrotum with the left hand, which stretched at the same time the skin of the perinæum, and at that part where the operation for the stone is generally performed, I forced in, perpendicularly, the point of a bistoury, until it came against the stone, which was inclosed in the neck of the bladder. This puncture made, I rested a few

¹ Mr. Gamgee gives the account of Moreau's operation from Deschamps' *Traité Dogmatique et Historique sur l'Operation de la Taille*, Paris, 1790. He wrote his own description, however, before seeing this.

seconds; then I enlarged the opening in the integuments, and carried my finger into the wound, thinking to touch the stone, but the point of the bistoury had only divided the part sufficiently far towards the exterior, and, therefore, the division was not perfect. After a momentary repose, I carried the instrument again into the wound, and completed the section. Then with my index and little finger, I searched for, and soon succeeded in extracting a calculus of about the size of a large nut. The operation over, the urine flowed in abundance. I dressed the wound with lint dipped in an emollient decoction, being perfectly relieved from my pain. I fell into a sound sleep. On the following day, I was as tranquil and cheerful as if I had never suffered.

"Many physicians, my friends and colleagues, and a great many persons whom I do not know, surprised at such news, flocked to my house to assure themselves of a fact which appeared to them truly astonishing. Professor Bécларd has himself honoured me with a visit, and examined the stone."

Vesical Calculus in the Female.—The occurrence of stone in the female is so infrequent, compared with the male cases, and the anatomical structure of the parts is so favourable for its spontaneous expulsion, that an operation for the removal of large concretions is uncommon.¹

Dilatation of the nearly straight and short female urethra is often practicable to a remarkable extent;² especially if aided by a very slight incision at the urinary meatus. When sufficiently enlarged, forceps are introduced, and, with stones of moderate size, extraction is at once effected by careful and gentle traction, more by skill than force. Sponge tents, bougies, catheters, or the dilators now manufactured for the purpose, are used. Should the size or shape of the stone forbid its issue entire, it may be broken by a lithotrite,³ and the pieces scooped out. There is often troublesome incontinence of urine for a time, but these cases generally do well.

Mr. Fergusson's method, viz., to dilate the urethra with a steel

¹ The spontaneous expulsion of certain marvellously large calculi is on record. Two, five, and even *twelve* ounces, are mentioned; the last by Klauder. (Gross.)

² And it is doubtless sometimes rashly and too much dilated, producing incontinence of urine, etc. etc.

³ The instruments known as Heurteloup's, Jacobson's and Weiss' lithotrites may be employed.

instrument, so that the forefinger may be passed into the bladder, through the canal, and then dividing the anterior half of the passage, is highly commended. In this way, Mr. F. once took away a stone three inches in circumference, his patient having no incontinence of urine whatever. The vesical neck and posterior part of the urethra being unharmed, the latter result is secured.

Precisely the reverse operation has been successfully done in the United States by Dr. Baker, of New York, and Professor Alden March, of Albany. By retaining a catheter in the urethra for a fortnight in the first case, the wound nearly healed, and the urine could be retained for two hours. Dr. Gross, commenting upon the two methods, believes them both far better suited than the ordinary ones to obviate incontinence of urine. The latter surgeon strongly advocates lateral incision in the female, and does not think incontinence of urine by any means sure to follow. He instances a case under the care of the late Dr. J. Kearney Rodgers, of New York. The stone was so large that the introduction of two pair of forceps, expanded crucially over its long axis, was required before it could be extracted. "No incontinence of urine followed." The preliminary incision was made with a long, broad, straight bistoury, and was carried downwards and outwards towards the tuberosity of the ischium. *Weight* of the stone, nine ounces and five drachms; *size*, nine inches and a half long, seven and three-quarters across, at the widest part.

The instruments required are a straight, grooved staff, its groove being turned somewhat downwards and outwards when introduced, so as to lie parallel with the left ramus of the pubis;¹ a blunt-pointed bistoury, with which the canal is divided; and forceps to extract.²

At the Westminster Hospital, under Mr. Hillman, three cases of calculus in the female bladder were successfully treated by dilatation. The detailed account may be found in the *London Lancet* for October 1st, 1857. The patients were one adult and two children. The first case was that of a child of five and a half years; the stone was removed by dilatation and incision combined. The second case was in the person of a woman of forty-six years; dilatation, only, was used. The third was a child of five years and a half; dilatation, only. Chloroform was employed as the anæsthetic agent.

¹ Coulson.

² See Appendix, Note X.

A case of very extensive dilatation of the female urethra is reported in the *Lancet*, January 9th, 1858. The patient was an elderly woman, from whose bladder a calculus had been some time previously extracted by dilating the urethra. On entrance at St. George's Hospital, Mr. Tatum detected another stone. On sounding the bladder some time after the patient's admission, preparatory to removing the stone, the latter had disappeared. On examination of the urethra, it was found of sufficient size to admit the finger, and Mr. Tatum believed the patient had removed the calculus herself. No *stillecidium urinæ* had ever been experienced by the patient, notwithstanding that the dilatation was so great, and had been so long continued. It may be suggested that, if the stone in question was a small one, it may have been spontaneously expelled; which would seem as likely as that the woman should have, herself, extracted it.

Circumstances Rendering Lithotomy Unadvisable.—All very serious disease of the urinary organs, complicating vesical calculus, and especially if malignant or far advanced, renders both lithotripsy and lithotomy perilous. In grave conditions of the general system, also, such as the phthisical, cancerous, cachectic or hæmorrhagic, the prudent practitioner will decline to operate. General languor and feebleness of constitution are decided objections. The hæmorrhagic diathesis evidently precludes the attempt, unless we are willing to encounter an almost certain and great risk. Phthisical patients who are not very ill, and for whom there is some prospect of arresting the tuberculous disease, might be relieved of a *troublesome* stone. If, however, there is not great suffering and inconvenience, it will be best to let it remain. Dr. Gross adverts to the opinion of M. Belmas, that certain phthisical cases have been arrested, and some apparently cured by lithotomy. It is difficult to discover the *rationale* of such an action, and we incline with him to consider the results as recoveries under desperate circumstances, on the *post hoc*, and not *propter hoc* principle. Generally, any arrest of tuberculous disease during the healing of a lithotomy wound, is only on antagonistic grounds; the wound being closed, the pulmonary disease will most probably be even more marked and progressive than previously.

Analogous phenomena, it is well known, accompany pregnancy in tuberculous females. The future history of phthisical patients,

reputed well in consequence of being lithotomized, should be very closely investigated, before endeavouring to deduce a rule of practice from any appearances observed directly after operating. Recurrence of tuberculous disease, thus checked for a time, in some may be tardy, whilst in others it is immediate. It would be worth while to practise lithotomy, even without stone, paradoxically speaking, if vesical section cures phthisis!

With regard to affections of the urinary organs, it is universally conceded that Bright's disease, coexisting with vesical calculus, is an element totally adverse to good results in lithotomy or lithotrity. Perhaps, if the patient be seen in the very earliest stage of the renal malady, and the calculous affection is urgent, an operation may be done. The later stages are wholly unsuited to it; the patient is nearly sure to decline and die. The importance of recognizing the existence of the renal affection must therefore be apparent, and the reputation of the surgeon, no less than the welfare of his patient, depends upon professional knowledge and judgment.

Dr. Rees (*op. cit.*, pp. 80, 81) refers to the difficulty often experienced in these cases of complication, in determining the actual existence of Bright's disease, and mentions the danger of operating for stone when the renal difficulty exists. The surest way, when the urine contains pus and blood, as it does in both the affections referred to, is to wait until, by treatment, we can secure a specimen of bloodless urine; if the latter be albuminous, *morbis Brightii* is almost certainly present; if not, we may conclude that former specimens, manifesting albumen, derived it from the admixture of pus and blood.¹

Disease of the bladder itself, especially if there be likelihood of

¹ The following opinions relative to complications contra-indicating the operation, may fitly be presented here: "The existence of organic disease in any important structure is a most unfavourable circumstance as regards the ultimate success of the case." (Coulson, *op. cit.*, Lithotomy, p. 263.)

"The existence of hectic, or pulmonary consumption, or of any other extensive disease, requires the surgeon to decline the operation, or at least to perform it only at the urgent and repeated request of the patient, who should be informed of its probable result." (Druitt, *Vade Mecum*, Lithotomy, p. 534.)

"Persons affected with Bright's disease are particularly bad subjects for operations of [*sic*] stone in the bladder, by whatever method they may be executed." (S. D. Gross, *op. cit.*, p. 537.)

"Operations performed on those who suffer from *morbis Brightii* are attended with great danger; and this particularly applies to the operations of lithotomy and lithotrity." (G. Owen Rees, *Croonian Lectures*, 1856.)

excessive bleeding, as when fungous growths exist, of course effectually contraindicates the operation. Ulceration of the organ (Gross) should be considered a positive obstacle. If the affection have existed for some time, the general health will, in all probability, be so much impaired that it will be imprudent to operate. Here, again, the great value of correct diagnosis is manifest. If the source of the pus be satisfactorily determined, the ground of treatment is afforded.

Great hypertrophy of the prostate gland, with or without actual disease of its structure, properly forbids lithotomy; and, if malignant disease exist, lithotripsy also. Old men are most liable to this condition. It is believed, however, that it is seldom fatal.¹

3. *Lithectomy*,² *Cystectomy*.³—This operation is a composite one of cutting and dilating processes. The prostatic portion of the urethra is to be dilated, the membranous part having been divided. Forceps are then introduced, and the stone is seized and extracted.

The method may be considered a modification of that of MM. Manzoni and De Borsa.⁴ The latter accomplishes dilatation at once, by means of the finger; the other surgeon more slowly, with instrumental aid. In both forms of operation, the same part of the urethra is divided; in lithectomy, Arnott's dilator is used instead of the finger. An oiled silk bag is passed along the groove of the staff (which is used as in other operations of the sort) into the bladder, and tepid water is injected so long as the induced pressure can be borne. Reiterated, but careful and very gentle dilatation is then effected; but thirty or forty hours may be requisite before forceps can be thus introduced.

The operation, notwithstanding the great alleged success it has had in some hands, is not a popular one. Many accidents, we conceive, might attend or follow it, such as escape of urine into the cellular tissue; inflammation there, and at the vesical neck; pain, from the efforts at dilatation, might induce feverishness and exhaustion in many; the time required is a serious consideration; and, after all, the calculus may be so large as to require further

¹ Gross, *et al.*

² *Λιθος*, calculus. *Εκτασις*, extensio; suggested by Dr. Arnott, of London; first performed by Sir A. Cooper, in 1819.

³ *κύστις*, the bladder; *εκτρυψω*, to draw out.

⁴ Allusion has lately been made to these operators. *Vide* p. 437.

incisions. If the stone be very small, the extraction would be easy, and the result probably favourable. To such cases only, we think, is this procedure applicable.

XI. FOREIGN BODIES IN THE BLADDER.

In immediate connection with stone in the bladder, the presence of other foreign bodies there may be appropriately noticed. They reach the interior of the viscus either through carelessness in surgical manœuvres, defects of surgical implements; gun-shot and other wounds inflicted from without; or by the patient's manipulations; the latter being of course unexpected, as in the exaggerated impulse to onanism sometimes so unfortunately existing both in males and females, as various recorded cases prove.

Mental and moral hygiene are to be cultivated in these cases, as well as all those means which tend to corroborate or restore injured physical health. Examination should be made thoroughly, once, after extracting foreign bodies, for morbid growths, elongated or hypertrophied clitoris, etc., which might keep up the prurient tendency. We should then decline all exploration.

As such bodies, however introduced, are sure, if permitted to remain, to become encrusted with calculous deposit, they must be extracted without delay. Usually, the concretion formed around such nuclei is either of lithic acid, or phosphatic; oxalic formations are said to be rare.

Another serious accident resulting from the entrance of foreign bodies into the bladder, is wounding and even perforation of the organ; the latter either occurring directly or by ulceration or gangrene.

If small, the body may be spontaneously expelled; generally, however, operative measures must be resorted to. Dilatation of the urethra may be effected; and round, small, smooth bodies, would possibly pass. Instances of musket-balls being thus extruded are on record. Forceps are the next resort, and those known as Cooper's are doubtless the best. Should it be impossible either by dilatation or by the forceps, to extract the foreign body, owing to its size or peculiar shape, the lateral operation for lithotomy must be performed. Démarquay¹ used the lithotrite in a case,

¹ Mémoires de la Société de Chirurgie de Paris, 1851.

where, after gun-shot wound, a piece of one of the pelvic bones formed the nucleus of a calculus. No union of the fistulous opening into the bladder took place, and death from exhaustion ensued. There was urinary infiltration at first, although the catheter was used; and afterwards multiple abscess and erysipelatous inflammation occurred.

Sometimes a pin or needle may be caught in the eye of a catheter. Lamotte thus extracted, after four attempts, a large diaper-pin from the bladder of a female.¹ Foreign bodies in the male bladder are of course far more difficult to extract than in the case of females, and often require all the patience and dexterity of the surgeon. Frequently, lithotomy only will effect extraction. Nothing can excuse that faulty fabrication of instruments which sometimes subjects the patient to so much trouble and danger, from fracture or detachment of portions. The surgeon also should always be sure of the quality of his instruments, and especially should he be careful not to use *old* gutta-percha bougies, which are liable to break, and a piece to be left in the urethra.² The entire female catheter has sometimes slipped into the bladder. Dilatation, with the subsequent use of long, slender, and straight forceps, will usually effect its extraction.³ Sometimes, after dilating the urethra with a sponge tent, the forefinger may be introduced and the offending substance removed.⁴

Mr. Coulson and the late Mr. Key were once foiled in extracting two pieces of a thin gum-elastic catheter, broken into the urethra near the bladder. They were, however, after three weeks, voided spontaneously.

A. WORMS IN THE BLADDER.

Many curious instances of the existence of worms in the bladder are on record. Coulson particularly mentions those discovered by Mr. Curling, of London. These were at first supposed to be the larvæ of some insect. In many cases, the presence of worms is ascribed to migration from the colon, rectum, or small intestines,⁵ it having been noticed that the ascaroid and lumbricoid varieties prevail.⁶ They either pass by perforating the vesical coats, or

¹ See Appendix, Note Y.

² Whence it would easily slip into the bladder. See Appendix, Note DD.

³ Coulson.

⁴ Mr. Toogood.

⁵ Gross.

⁶ M. Jules Cloquet (*Anatomie des Vers Intestinaux, etc.*, Paris, 1824,) alludes to the numerous reports of the discovery of lumbrici in the peritoneal cavity, in the

through an artificial opening resulting from an abscess or a wound. All practitioners are familiar with the fact that ascarides, in female children, frequently pass into the vagina from the rectum; that they enter the bladder *per urethram* seems unlikely, if not impossible.

Mr. Lawrence, of London, described the *spiroptera*, and he relates a case in which a female, twenty-four years old, voided between 800 and 1000 of this species in the space of two years.¹ Professor Owen has reported a curious case, where these worms were passed by a woman for many years. (*Cyclopædia of Anatomy and Physiology*, Art. Entozoa, vol. ii. p. 127.) Mr. Curling's worm is called by him *Dactylius aculeatus*. It is cylindrical, of annular form, and tapering at the extremities.

Certain other varieties are mentioned. Small red-headed worms are referred to by Dr. Campbell, of Conn. (*Amer. Journal of Med. Sci.*, vol. xxi. p. 130.) These were about half an inch long, very active, and strong. The remarkable fact is stated that two of them, placed in a quill, were carried in the pocket for four weeks, and were then in a lively condition! Cartilaginous rings formed the body, which was supplied with two rows of legs.

* Symptoms somewhat simulating those of calculus announce the presence of vesical worms. Feverishness and emaciation follow. No positive diagnosis can be made, until they appear in the urine. The latter is often filled with thick mucosities, and is sometimes bloody. Dr. Gross mentions occasional paralysis of the bladder. In Mr. Curling's case, there were no symptoms indicative of urinary difficulty. The worms were accidentally discovered. In

kidneys, bladder, frontal sinuses, etc. He adds: "Many of these observations are inaccurate; they prove that worms of other and very different species, and even inorganic matter, as fibrinous clots, have been taken for lumbrici. Notwithstanding, there are facts which cannot be doubted. Thus, M. Duméril told me that he had seen a patient pass an *ascaris lumbricoïdes* by the urethra. A similar observation is recorded of Stromaier (Greg. Horstii op., t. ii., Norimb., 1660, p. 558)." Cloquet also cites MM. Moublet and Raisin as reporting similar instances in the *Journal de Médecine*, tome ix. pp. 244-260; tome xx. p. 458; and also the inaugural dissertation of Christ. Ruhn, *De ascarid. per urin. emiss.*, Jen., 1798.

¹ A case occurring in Indiana in 1834, in the practice of Dr. Bardwell, is reported in the seventh volume of the *Western Journal of the Medical and Physical Sciences*. "Many thousand" worms of the lumbricoid variety are stated to have been passed from the bladder. Turpentine, in this and in another case where the *Dactylius aculeatus* was voided, seemed expulsive. (Gross.)

other instances, the sound has been resorted to, so imperative were the seeming calculous symptoms.

There is no very positive evidence that anthelmintics, taken by the mouth, have facilitated the expulsion of the parasites. In one or two instances, such an effect was supposed. We find the injection of various substances into the bladder recommended. Having evacuated the urine, properly diluted solutions of vinegar, spirits of turpentine, garlic, creasote, aloes, or chenopodium, may be employed. The frequent use of the catheter is advised, in the hope of destroying the worms by pressure. Hunter's forceps were successfully employed by M. Artaud, of France, in removing "worms and fleshy substances from the bladder of an unmarried woman," twenty-six years of age.

The exit of the *Strongylus gigas* from the human body *per urethram*, has been noted. A prolonged series of such occurrences, in a single female patient, twenty-six years of age, is reported in the *Archives Générales de Médecine* for February, 1846, by M. Artaud. The case is given in detail, and deserves perusal. The patient was habitually strong and healthy; had been complaining for eighteen months; symptoms at first those of nephritis, then heat and pricking sensations (*picotement*) in the renal regions. Energetic depletion was found injurious; the patient lost ground, and the menstrua were suppressed. Hiccough, cough, pain in the right thigh, and hæmaturia followed. After three months' severe suffering, she passed a strongylus, or what closely resembled it, from the urethra, spontaneously. Several were afterwards extracted, as were also portions of false membrane and pieces of soft spongy tissue. The report is authenticated by M. Ségalas. At the time the communication was made, the patient was still living, but suffering, and had lately passed more worms.

According to Bremser, the *Strongylus* is rare in man, and many erroneous reports have been made of its having passed from the urinary passages. Some of these cases, he believes, are to be referred to ascarides or oxyurides, which have made their exit through intestino-vesical or vesico-vaginal fistulæ; and others are to be ascribed to membranous or polypous blood-concretions, resembling *Strongyli* by reason of their round form, "and which had probably obtained this form from the ureters, and when they were smaller, from the *tubuli uriniferi*." (Küchenmeister.)

Küchenmeister refers to several instances, and has certain ex-

ceedingly interesting remarks upon this subject. He cites Bremser as certifying to the truth of many cases. Amongst them is that of the Archduke Ernest, of Austria, who died in 1595, and "in whose kidneys Hugo Grotius found a stone and a still living worm, which had gnawed the neighbouring parts, *i. e.*, had eaten into them." There are several other references, and the entire account is such as well to deserve perusal. Küchenmeister seems, however, to believe that some of these instances may fairly be credited to the *Ascaris lumbricoides*. Dr. Lankester, who translated Küchenmeister's work for the Sydenham Society, mentions, in a note, that "there is a fine specimen of this worm (*Strongylus gigas*), taken from a human kidney, in the Museum of the Royal College of Surgeons, of England."

With respect to symptoms, diagnosis, prognosis, and therapeutics, Küchenmeister says: "Without prejudice to any author, we may assert that we know nothing either of the one or the other. If several worms, or one large female, be present, the kidneys will be enlarged, and an enlargement will be detected by palpation, percussion, and perhaps by inspection; but the cause of this swelling, of any flow of blood from the urinary passages, or of any existing retention of urine, would only be recognizable when worms have actually passed from the bladder. Therapeutics can only interfere after the passage has taken place, and then only to alleviate irritation, by mucilaginous or oily remedies, which pass into the urinary passages, such as emulsions and mucilaginous decoctions and tea." (*Op. supra cit.*, Syd. Soc. edit., p. 380-1.)

Küchenmeister has recorded many interesting facts relative to the presence of several other worms in the urinary organs, and their evacuation from them. A few of these may be here referred to.

The author himself mentions the existence of the *Echinococcus altricipariens* in the human kidney. In a case observed by him and Jüttler "daughter and grand-daughter-vesicles passed off through the urinary passages for a twelvemonth, but after a very strong evacuation, they at last ceased." After a year's respite, the same phenomena recurred. The *Echinococci* of the kidneys have been recognized by J. Müller and Frerichs, besides Küchenmeister. The latter observer thinks that *Echinococci* of the ovaria may not only perforate towards the anus, but that they may go through the vagina or the bladder; also that those "of the liver may pass through the bladder when they are of enormous size." (*Op. cit.*, p.

223, Syd. Soc. edit., 1857.) Creplin is cited in the same work as reporting an instance of *Cysticercus vesicæ hominis*, from an account furnished by Dr. Weitenkampf (*Sanitätsberichte des Königl. Medicolligiums von Pommern*, 1835, 2 semest., p. 52). The patient was a young woman, who, after the usual symptoms of bronchitis, etc., passed hydatids with her urine in considerable quantities, with strangury every five or six days for several months. Küchenmeister believes these were *echinococci*.

Bilharz (*op. supra cit.*) gives the mucous membrane of the urinary bladder and the ureters as one locality where the vesicles of the *Distomum hæmatobium* are found. Excessive hyperæmia and bloody extravasation, with a swollen and inflated condition of the vesical mucous membrane, are observed as effects of the presence of this worm. There may also be an exudation of tenacious mucus of a grayish-yellow colour, and in which the eggs are imbedded. The injection and ecchymosis are in small spots only, the whole mucous coat being very rarely affected. The urine is pale and clear, but mucous; Bilharz detected eggs in it. A subsequent change is that where grayish-yellow or discoloured elevations, mixed with many pigment spots, is observed, the mucous membrane looking as if it had been kept in spirits. There are still further morbid changes; and sometimes the calcareous incrustations of the egg-shells, the deposition of the salts of the urine, and the aggregations of eggs, give the whole a sandy texture. Very rarely, this coat covers true ulcers with loss of substance. (*Loc. cit.*) Excrescences or vegetations from one to three lines in height, single or aggregated, wart-like, fungous, etc., are found on the mucous membrane of the bladder.

In addition to the above injuries of the vesical mucous membrane, that of the ureters, and, in very exceptional cases, of the renal pelvis, is similarly attacked. "In the ureters we then see irregular, insulated, grayish-yellow, slightly elevated plates, with a soft, tender, firmly adherent coat of dark urinary gravel, sandy to the touch." This gravel is composed of imbedded eggs of *Distoma*, blood, exudation-corpuscles, and uric acid crystals. Strictures, with partial or total dilatations of the ureters above them, take place; retention of urine is then likely, "especially when hypertrophy of the muscular coat occurs at the same time." Tumefaction and hyperæmia of the kidneys, with injection of their pelves, pyelitis, and even fatty degeneration, are induced by a prolonged duration

of the affection. "Pyelitis and fan-like dilatation of the pelvis and calyx, with complete atrophy of the substance of the kidney, also occur." Stone and gravel are frequently caused by the aggregations of eggs affording nuclei for their deposition in the kidneys, ureters, and bladder. "This is the *lithiasis* of the Egyptians, already described by Prosper Alpinus in his '*Medicina Egyptiorum*.'"

As Küchenmeister remarks, the whole system must necessarily suffer from these uropoëtic disturbances. General illness and even death follow. The constitution being wholly broken up, pneumonia, diarrhoea, or other disorders, generally destroy the patient. It is suggested that the "mechanical pneumonia," of Virchow, may be the kind which is observed, viz., that wherein "the coagulum and similar insoluble bodies, borne along by the circulation, stop up the capillaries of the lungs." The author adds that "inasmuch as these animals live upon the blood, they might probably cause chlorosis, but no case appears to Griesinger to show that the *Distoma* alone could be the cause of this."

2. FETAL REMAINS; HYDATIDS AND SEROUS CYSTS; HAIR AND AIR IN THE BLADDER.

The presence of either of these in the bladder is rare. The first induce symptoms not unlike those of calculus, the diagnosis being very obscure, unless certain portions of the foetus are passed *per urethram*. A few remarkable instances are on record.¹ The suprapubic operation for lithotomy has been performed in such an emergency, by Josephi, of Rostock.

Sir B. C. Brodie mentions a case where a jaw, with full-grown teeth, was found in the bladder. In 1817, a case occurred to Dr. Joseph Bossuet, of Hingham, Mass.²

Serous cysts come down from the kidney, and, during their stay in the bladder, excite vesical tenesmus, with frequent desire to micturate. Sometimes there is partial, and even entire obstruction to the urinary flow, owing to their presence near or within the inner urethral orifice.

No distinctive symptoms arise from acephalocysts in the bladder; there may be nearly the same manifestations as in the case of serous cysts, and their renal origin is altogether probable. Sometimes they may have been introduced from some pelvic cyst opening by

¹ Gross.

² New England Journal of Medicine and Surgery, vol. vi. p. 134.

ulceration into the bladder. (Coulson.) Usually very small, they have been observed as large as a pullet's egg. Collections of hair in the bladder easily constitute nuclei for stone, and all the symptoms of calculus may spring from their presence, if in large quantity.

The female bladder is more obnoxious to them than the male; and it is believed that "false conception" is very frequently the cause. The uterus, ovaries or Fallopian tubes are generally in an abnormal or diseased state. Adhesion between the uterus and bladder is common, with inter-communication; and there are often foetal remnants also. Hair in the bladder is found loosely floating, or encysted.

Delpach removed a large mass of hair and earthy matter from a cyst near the vesical fundus, by the use of the *lithotome caché*. The patient was a female. Subsequently, a part of the cyst itself was taken away,¹ and the patient recovered, after a further discharge of hair, calculous matter and foetal remains.

In general, a paralyzed condition of the bladder from various causes, organic or accidental, is that in which air has been found contained in it. Instances are referred to where the organ was nearly full of gas. Generally, only bubbles of air escape, and a gurgling is heard on using the catheter. The urine being usually healthy in these cases, a conjecture has been hazarded that the gas is secreted from the vesical mucous membrane. When an unhealthy state of the urine is declared—as happens in protracted spinal disease, or when it is long retained in sacculi of the bladder—it is possible that decomposition, or an analogous change, causes the phenomenon.²

¹ Partly by ligature.

² A very elaborate paper upon *Foreign Bodies in the Bladder*, has lately been published in the *Journal de Médecine de Bordeaux* (the numbers for August, September, October, November and December, 1856), by Dr. Denucé, and is well worthy of being reproduced in our own language. A great deal of research is manifested.

CHAPTER VI.

DISEASES OF THE URETHRA.

STRICTURE. (Organic; Spasmodic; Inflammatory.)

CARUNCULAR AND CELLULO-VASCULAR GROWTHS; POLYPOUS EXCRESCENCES OF THE URETHRA.

VARICOSE NARROWING OF THE URETHRA (in close relation to stricture).

CERTAIN REMOTE CONSEQUENCES OF ORGANIC STRICTURE.

LESIONS OF THE VERU MONTANUM.

DILATATIONS OF THE URETHRA.

AFFECTIONS OF THE FEMALE URETHRA. (Morbid Growths at or near the *Meatus Urinarius*; Prolapsus of the Urethral Mucous Membrane.)

STRICTURE OF THE FEMALE URETHRA.

General Anatomical Considerations.—Fully to describe the *urethra*, anatomically, and in its complex relations to the neighbouring organs, is neither compatible with our limits, nor demanded by the nature of the subject proposed.

After referring to the general structure of the canal, and to its more important relations, any anatomical points requiring notice, will be interwoven with the pathological and remedial comments to be offered—and with special reference to the *surgery* of the parts concerned.

Besides the various anatomical works, so readily accessible, the College of Surgeons of England, selecting, with a wise policy, an individual affection of a single organ, for investigation, has been the means of eliciting that elaborate Treatise upon the Pathology and Treatment of Stricture of the Urethra, to which the Jacksonian Prize for 1854 was awarded. The most accurate and thorough anatomical examination, personally conducted; and the clearest physiological, pathological and therapeutical expositions charac-

terize this elegant volume, from the hands of Henry Thompson, F.R.C.S., M.B., of London. To this authority, we acknowledge a large debt of information upon this particular division of our subject.

The surgeon must rely upon *personal dissections* to fully qualify himself for meeting all the emergencies connected with urethral maladies. Much may be learned by the faithful descriptions furnished by various authors, and which are generally accompanied by illustrations—such as may be found in the works of Wilson, Cruveilhier, Quain, Fergusson, Malgaigne, Druitt, Sédillot, Civiale and many others.

Tact in the choice of and familiarity with the requisite instruments, are indispensable. Patience with the infirmities of sufferers, and gentleness in executing exploratory and surgical manœuvres, are hardly less necessary.

Anatomically, we find the urethra a membranous canal, curved in the male—nearly straight in the female; about nine inches long in the former—only an inch and a half in the latter.

Structure and Relations of the Male Urethra.—Its inner coat is a mucous—its outer, an elastic, fibrous one. The mucous investment is smooth, delicate, very sensitive, and thin. It communicates directly with the vesical lining-membrane; externally it fuses into the covering of the *glans penis*. At different points, the various¹ ducts open upon it—their lining-membrane joining its own, uninterruptedly.

The outer coat is thicker where the canal traverses the prostate gland; it firmly infolds the membranous portion; is thinner in the spongy portion, and serves to unite the mucous membrane and the *corpus spongiosum*.

Regions.—The three urethral regions, generally described, are, first the *prostatic*, involved in lithotomic operations—and whose structure is peculiarly interesting, whilst its surgical relations are highly important. Its length is about one inch (a little more); it lies in the upper third of the prostate gland; from its lower surface, rises the *veru montanum*,² often the subject of pathological changes. On each side of the latter, in two slight depressions, lie the openings of the prostatic ducts—the two ejaculatory, seminal ducts open just

¹ Those from the glands of Cowper; from the prostate, vasa deferentia, and vesiculæ seminales.

² *Caput gallinaginis; crête urétrale*—a fold of mucous membrane.

in front of the *veru*—and there is a third opening, between them, leading into “a small cæcal sac, the *sinus pocularis*.” (Wilson.) The prostatic urethra is shut when the bladder is empty, and remains so until desire for micturition arises. The *veru montanum* has a valve-like office, and, in conjunction with the encircling muscular tissue, complete closure of the canal is thus effected. At the moment of micturition, the longitudinal muscles, acting antagonistically to the circular fibres, open the prostatic portion, and the *veru* is drawn downwards by two small tendons inserted into it, and which originate from the *detrusor urinæ* muscle.¹ The prostatic urethra is the most capacious part of the whole canal.

The second portion is the *membranous* urethral tract; this is the narrowest, and is one inch long. Lying between the two deep layers of perinæal fascia, it is embraced by the *compressor urethræ* muscle, and, in addition to this covering, is enclosed by the elastic and mucous coats and a partial sheath from the perinæal fascia. Posteriorly it is connected with the prostatic portion, and anteriorly meets the third, or *spongy portion*, which extends to the *meatus urinarius externus*, and is embedded in the spongiose body of the penis. Posteriorly, it forms the *bulbous* portion of the canal—where, as at its anterior extremity, it is larger than through its middle course.

The surgeon should particularly note that the urethra is, normally, narrowest at the *meatus externus*; if a catheter pass the latter, it will traverse the whole canal.² The ducts of Cowper's glands open into the bulbous portion; the glands themselves lie just beneath the inferior edge of the *compressor urethræ*, and are influenced by its action.

Numerous mucous follicles or lacunæ open upon the lining surface of the urethra—their mouths looking forwards, and their number being largest upon the inferior wall. Catheters of small size, and certain other instruments, are occasionally liable to become engaged in these openings. The “lacuna magna” is about one inch and a half from the extremity of the penis. The greater abundance of these depressions upon the floor of the passage may be advantageously called to mind, when exploring it, or the bladder, with instruments.

The Female Urethra.—Passing directly downwards and forwards

¹ Tyrrell. Wilson.

² If that be healthy.

from the bladder, beneath the pubic arch, the urethra, in the female lies along the upper wall of the vagina. Its lining-membrane is mucous, and is longitudinally folded or plaited; it is continuous with that of the bladder, and outwardly merges in that of the vulva. Around this mucous coat, an elastic one is spread, in which are infixed the muscular fibres of the *detrusor urinæ*. The *meatus* is surrounded by a fibrous ring, controlling the expansive tendency of the passage at that point. Dilatation is far more easy, on account of this inherent elasticity of the passage, than it is in the male. In attempts to extract foreign bodies by this process alone, a slight incision, just at the meatus, will nearly always enable the surgeon to effect his purpose.¹

Certain late remarks relative to the Anatomy of the Urethro-vesical Muscle, styled WILSON'S. "Restoration of the 'muscle of WILSON' to VESALIUS as discoverer; and the part attributed to this muscle in spasm of the urethra."

Under the above caption, the *Gazette des Hôpitaux* of the 14th of May, 1857, contains certain remarks, of which we present a digest.

M. Leroy d'Etiolles is said to have established the fact that the pubo-urethral muscle, *constrictor urethræ*, or muscle of Wilson, has been described by Vesalius under the name of muscle of the *cervix vesicæ*. Vesalius considered the neck of the bladder as extending to the junction of the bulbous portion of the urethra with its muscular portion—that region where the urethra, suddenly narrowed, at its exit from the "gulf of the bulb," is bound down by an aponeurosis and by the attachments of eight muscles—the internal, longitudinal fibres of the bladder, dilators of its neck, being included in this number. These fibres go just to the neck.

It is at this *urethral strait*, the original vesical neck, and not in the portion embraced by the muscle known as Wilson's, that the first difficulties in catheterism are encountered, and that the phenomena of contraction, deformity and deviation occur, which are designated by the terms spasm and spasmodic stricture. When the sound has passed this point, it goes on without obstruction, until it reaches the *veru montanum*, where it encounters an obstacle of another nature. The same is true with regard to the passage of urethral injections, which if made with only sufficient force to reach

¹ Previous reference has been made to excessive, hasty and rough dilatation, as being improper and disastrous (p. 442).

the point of obstruction, *i. e.*, the urethral strait before mentioned, will regurgitate, but, if carried beyond it, will go into the bladder.

In another communication, M. Leroy describes a modification he proposes in managing the conductor of the concealed lithotome.

"This modification is designed to facilitate the engagement of the lithotome in the groove of the sound. We are taught, the urethra being incised in its muscular portion, to press the nail of the left index-finger into the said groove, in order to guide the button of the lithotome; but, unless the nail be of a certain length, if the assistant who holds the sound happen to give to it even the slightest lateral movement, the parallelism between the longitudinal incision in the urethra and the other incisions (sometimes semi-lunar, sometimes oblique) in the tissues in front of the urethra, is destroyed—and the surgeon is obliged to search for (*latonner*) the opening; and sometimes he must even make a new one with the bistoury.

"M. Leroy has devised two methods of obviating this difficulty. One is by placing a small blade in the end of the lithotome, and which cuts the urethra and then retires into its own sheath, while the end of the lithotome glides along the groove of the staff and enters the bladder.

"A second and simpler method, is to have a deep slit or furrow made in the end, or crest of the lithotome, to serve as a conductor. The surgeon, after having incised the urethra upon the groove of the staff, passes the bistoury, held in the left hand, and keeps the point thereof pressed against the bottom of the groove. He then takes the lithotome with the right hand, engages the cutting edge of the bistoury in the terminal slit of the lithotome, and thus has a sure guide to the groove of the sound or staff. M. Mathieu, of Paris, has made these instruments."

M. Leroy d'Etiolles has verified the utility of these modifications by operations.

With regard to the anatomical point above referred to, we are fortunate in being permitted to publish the following remarks and statements of facts, kindly furnished by the distinguished Professor of Anatomy in Harvard University, to whom we had appealed for an opinion as to the legality of demolishing Wilson's claim:—

"MY DEAR SIR: On careful examination of Vesalius and of Wilson, I cannot explain the alleged statement of M. Leroy d'Etiolles,

except on the supposition that he has never consulted the original authorities.

I have before me two editions of Vesalius; that of Basle, 1555, and that of Leyden, 1725, published under the supervision of Boerhaave and Albinus. Vesalius describes and figures the muscle of 'the neck of the bladder,' by which he means the membranous portion of the urethra, as orbicular, or annular, and compares it to the sphincter ani. (Lib. ii., caput i. and li. Figure prefixed to cap. xlix. of the same Book. Also, figs. 22 and 23 of lib. x.) The muscle is called *Vesicæ Sphincter* in the Leyden edition.

I have also before me the original paper of Mr. James Wilson, in the first volume of the *Medico-Chirurgical Transactions*.

Mr. Wilson describes 'two very distinct fleshy bellies belonging to muscles of a triangular shape,' passing downwards from the symphysis pubis, spreading on the membranous portion of the urethra, and meeting in a tendinous line beneath it.

He says also: 'My predecessor, in the anatomical lectures, Dr. Baillie, always demonstrated circular fleshy fibres surrounding the membranous part of the urethra, but he had not traced their attachment to the pubes so as to consider them as forming distinct muscles.' The figure given by Mr. Wilson, when compared with those referred to in Vesalius, would not permit the most careless reader to make a mistake, if he had glanced at these illustrations.

Having settled this small matter, you will perhaps be interested in a few additional notes I have just made with reference to the muscles about the 'neck of the bladder.'

In the first place, Vesalius does not claim the 'orbicular' muscle as his own discovery, but refers to it as being described by Galen. Galen says: 'Carnosus musculus in orbem circumjectus est vesicæ collo.' (*De Musc. Dissect.*, cap. 28.) He also 'prolongs the neck of the bladder' like Vesalius; 'ipsius collum, totum perinæum occupavit, ut quod sursum ab ano, cui primo incumbibat, usque ad pudendi exortum feratur.' (*De Usu Partium*, lib. xv. cap. 3.) He also compares the muscle to the sphincter ani. But his descriptions place the muscle at the commencement of the neck of the bladder, without defining its extent. (*De Anatom. Admin.*, lib. vi., cap. 14; and *De Sanitate Tuenda*, lib. ii., cap. 12.)

Thus it appears that Vesalius may have described a new ring of fibres, or sphincter; that, namely, anterior to the prostate, and surrounding the membranous portion of the urethra, but, at any rate,

he himself did not think he was speaking of any other muscle than that described again and again by Galen.

Müller disputes the existence of Wilson's muscle. (*Sharpey and Quain*, vol. ii. 539.) Mr. Guthrie arrived at the same conclusion as Müller. (*Ibid.*) But, according to Harrison, Mr. Guthrie says that Wilson's muscles 'descend only to the upper surface of the insertion of the transverse, and do not encircle the urethra;' thus recognizing their existence. (*Text-book of Practical Anatomy*, New York, 1848, p. 266.)

Mr. Guthrie has described certain transverse fibres under the name of 'new muscles of the membranous part of the urethra.' But this 'new' muscle had been figured by Santorini, who died in 1787, and whose admirable plates, long lost sight of, were published with the commentaries of Girardi in 1775. One of Santorini's beautiful figures is copied by Sharpey and Quain as the illustration of Mr. Guthrie's new muscle.

A pleasing imbroglio! Grand heading in the *Gazette des Hôpitaux* 'RESTITUTION DU MUSCLE DE WILSON A VESALE;' M. Leroy d'Etiolles confounding Wilson's triangular slips with the annular muscle of Vesalius; Vesalius referring the muscle he describes to Galen Müller denying the existence of Wilson's muscle; Guthrie also denying it, according to one authority, and recognizing it according to another; Guthrie himself describing a 'new' muscle which was figured long before he was born, and published in a quarto volume known to the whole scientific world, more than eighty years ago. It is necessary to make a few dissections of the parts—as well as of the anatomical authorities, before sending *our* Memoir to the Imperial Academy of Medicine.

Very truly yours,

O. W. HOLMES."

I. STRICTURE.

ORGANIC AND PERMANENT.—By an *organic, permanent* stricture, is meant one of sufficiently long standing and severity to have lastingly involved the structure of the parts—so that the unaided natural forces will not enable the canal to regain its normal calibre and elasticity. We here exclude constrictions which arise from *idiopathic* inflammation—and which, sometimes by resolution—and,

at all events, under proper treatment, may wholly subside. Nor is it incumbent upon us to describe the urethritis of venereal origin, when cited as largely influential in the causation of stricture. Our

Fig. 50.



Strictured urethra.

Fig. 51.



Strictured urethra.

chief attention will be given to the relative frequency and power of the *causes* of this condition; to the enumeration of the *parts* especially involved, and to what *extent*; to a summary of the usual *effects* of the lesion; its *locality*, etc.; to the *treatment*, and what may be expected from it, in other words, *prognosis*.

Causes.—Very many are enumerated; as blows, kicks and wounds in the perinæal region, and the cicatrices arising from the latter; the action of various irritating substances applied to the mucous lining-membrane; malformations; growths within the canal, and also ulceration there—stricture being attributable to the resulting cicatrices;¹ horse-exercise and concussions therefrom upon the perinæum—sometimes accompanied by laceration; masturbation and excessive venereal indulgence; unhealthy conditions of the urine. Spasmodic stricture *frequently recurring*, is stated to be an exciting cause; certain constitutional affections inductive of inflammation, and particularly those referrible to the cachectic, scrofulous, gouty and rheumatic diatheses.

Tubercular or cancerous deposit may take place into the urethral tissues, and form stricture. Injections, used with curative intent, and caustics also, have been similarly accused. Some of the best observers, however, doubt the agency of the former, and also ques-

¹ Ollivier thinks this must be rare.

tion whether lithotomy, like lithotripsy, induces the difficulty. In lithotripsy, the frequent use of the crushing instrument and of the sound, presents a direct cause; whilst, if lithotomy ever produce stricture, it must be by sympathetic action, which seems unlikely.

One of the clearest arrangements of the causes of organic permanent stricture is that by Mr. Thompson. (*Op. cit.*) He gives *Urethritis* the first place—it constitutes a distinct class. The inflammation frequently extends to the surrounding textures; is either *specific* or gonorrhœal, or *non-specific*; and is observed in both an *acute* and a *chronic* form. The non-specific causes of urethral inflammation, sometimes producing permanent stricture, are repeated spasmodic contraction or constriction; irritating secretions from the female organs, as the menstrual fluid and leucorrhœal discharge, abnormal urine and adventitious matters contained in it; venereal excess; injections(?); caustics; horse-exercise; masturbation. Next are ranged *Constitutional Causes*—which we have already mentioned.¹

The second class of causes is constituted by cicatrizations and adhesions following urethral chancres, simple ulcers, and the outlets of abscesses and fistulæ; wounds, lacerations, etc., either from violence, or by the use or abuse of instruments; chordee; passing calculi; urethral section *in perineo*;² amputation of the penis; lithotomy(?).

The third class is formed from the morbid growths and deposits in the canal; and the fourth from congenital malformations.

Relative frequency of the Exciting Causes.—Experience seems to decide that *gonorrhœal inflammation*, if frequently renewed, is a prolific source of those changes of tissue resulting in stricture. It is rare that a primary attack (or even two or three, unless neglected), thus terminates, except there be a predisposition to urethral contraction through the influence of any of the diatheses referred to. It is chiefly in inveterate cases, and where the inflammatory state is every now and then renewed, that the condition is manifested. A very irritable condition of the parts is likely thus to be acquired, and the imprudencies characteristic of the usual subjects of the affection constantly aggravate it. Whatever irritates the urethral surface—as, for instance, the re-application of gonorrhœal matter, and the renewed contact of vitiated discharges—or whatever excites congestion of the parts, increases the tendency to the deposition of

¹ Also termed *Idiopathic*.

² *I. e.* division of the canal, by wound.

plastic lymph into the surrounding tissues, and to subsequent thickening and to narrowing of the passage.

If, at such periods, there have been an unhealed laceration, long contact of the urine will occasion ulceration, slow repair and dense cicatrization of the surface, with a puckering or a direct constriction of the canal, subsequently.¹ Years, even, may elapse, before all the conditions constituting permanent stricture are fulfilled. In such instances, prolonged stimulation by alcoholic or malt liquors, is admitted to be very influential in keeping up a low, subacute inflammation about, and within, the urethra.

A fact of great importance is insisted upon by Mr. Thompson, viz., that it is not so much, if at all, the primary gonorrhœal affection which causes stricture, as the effects of the inflammation propagated to lower portions of the canal.² It is well known that the seat of the gonorrhœal disease and that of stricture are very often remote from each other; and therefore it is very plausibly argued that the influence of the inflammatory affection in forming stricture is a sequence—an extension of its essence, causing the pouring out of lymph “in and beneath the mucous membrane,” and the resulting contraction of the canal.

Of non-specific causes, very frequent spasmodic contraction is believed to be the most common and powerful. Closely allied to inflammation, and in nearly all cases, soon followed by it, spasm is a mischievous condition. When inflammation is once established, the two states reciprocally aggravate each other, and mistakes in treatment may very naturally happen. In these cases, measures directed against the irritable symptoms will probably be soon successful; and the use of instruments only serves to increase the inflammatory manifestations. Hence arise many instances of permanent and aggravated stricture.

The menstrual fluid,³ and various secretions from the female genital organs, especially when cleanliness is neglected, undoubtedly give rise to urethritis, and stricture may result. Abnormal constitution of the urine, owing to its excessive acidity or alkalinity, may irritate, and finally inflame the urethra, with an obstructive result.

¹ Thompson.

² John Hunter's denial of gonorrhœal inflammation as a cause of stricture was based on the idea, that if a cause, the stricture should be in the locality of the inflammation; but it is now understood to result from the after effects of chronic urethritis, extending backwards.

³ We are cognizant of at least one undoubted example of this nature.

Brodie's opinion is, in substance, that deposits of triple phosphate are a warning of stricture; and a general idea of the greater efficiency of alkaline than of acid urine, as a cause, prevails; but any great departure from a normal condition is likely to cause inflammatory, and, by consequence, obstructive disease. There is, moreover, abundant evidence to prove that articles introduced into the system, in the form of food or medicine, strongly irritate the urethra, and subject the patient to very lively inflammation. Beer, ale, and acid wines, appear to have this quality. Mr. Thompson asserts the same of asparagus in some individuals.

It is but very rarely that even patients attribute stricture to the use of injections, so that the influence sometimes claimed for them as causes seems, to a great degree, unfounded. Caustics, in the solid form, are more influential in inflaming and subsequently narrowing the canal.

Inordinate and protracted venery doubtless has laid the foundation of urethral inflammatory action, and disposed the canal to strictured states. Of *masturbation*, more doubt is expressed by observers. Ricord believes it "rarely, if ever," a cause; Lallemand has insisted upon it; Sir Everard Home attributed two cases of "spasmodic" stricture to its influence. Mr. Thompson, referring to these authorities, states that he has never traced a stricture to this sort of self-abuse.

The idiopathic or constitutional causes are oftenest indirect in their agency. There are irritable states of the genital organs peculiar to certain individuals, and likely, if aggravated in any way, to excite inflammatory disorder, with subsequent obstruction. These susceptible patients take gonorrhœa very much to heart, and are seriously ill from the same amount of exposure which in others would, perhaps, be nearly or completely inert. In these, and in delicate, scrofulous persons, permanent stricture is a not uncommon result of gonorrhœa.

Diathetically, gout and rheumatism may be looked upon as predisposing to permanent stricture, *viâ* the spasmodic form. It is asserted that rheumatism of the perinæal muscles is a too little recognized "direct" cause of stricture.

Climate is thought to have some influence in inducing stricture. The natives of warm countries have more virulent gonorrhœa than those of temperate zones. The same, it is known, is true of dys-

entery, and a certain analogy has been drawn between the two affections of the neighbouring passages, climatively.¹

The larger number of organic strictures remarked in the hospitals of Great Britain, is ascribed, in great measure, by some authorities, to the "national habits," and especially to certain dietetic peculiarities. Certainly there is no lack of repetition of gonorrhœa, in France, in the same individual, and perhaps not in England; for the streets of London furnish ample evidence of the unstinted opportunity to acquire the disorder. There may be something in the difference of climate, yet that is hardly supposable, on similar grounds of reasoning as were adopted in reference to tropical and temperate countries. Moreover, there is no very great difference between Paris and London as to temperature, although there is much in respect of clearness of atmosphere. The great quantity of stimuli used in Great Britain, both in the shape of solid food and of alcoholic and fermented liquors, seems justly accused of increasing the tendency to organic stricture.

The effects of the healing of solutions of continuity in the urethral mucous surface—as after chancre, ulceration, laceration by wounds or instruments, etc.—and their tendency to produce constriction of the canal, must be very evident to all who have observed these accidents. The analogy is close between them and burns or external ulcers. Instances proving this are on record. Such is the case recorded by Mr. Thompson (*op. cit.*, p. 127), where a single chancre surrounded the entire external *meatus urethrae*; and where, finally, stricture of the orifice was certain. Folds of the urethra may adhere after urethritis, and thus permanently narrow the canal.

The countless accidents to which men are subject, furnish direct causes for organic, permanent stricture, when the urethra is wounded. Falls from a height, possibly bringing the perinæum smartly against some hard or sharp object, as happens to sailors at sea,² so that it is either cut or contused—very likely wounding the urethra; kicks and blows sustained in a quarrel; the breaking of china or earthenware beneath the perinæum—especially liable to occur in children; bruises of the parts against the pommel of a saddle, or upon the

¹ Thompson—In India, etc. In Cuba, the writer can testify analogously.

² The worst cases of stricture are often witnessed in sailors. Doubtless the neglect of direct injuries inflicted upon the urethra, insufficient or improper treatment, and the constant exposure to impure connection are the chief causes.

horse's backbone, when no saddle is used; crushing of the pelvic bones by the fall of earth or of bales of goods—or by the passing of a wheel across the body in their region; tampering by a patient with the penis affected by chordee, as in endeavouring "to break" it, as it is termed—of which there have occurred examples, the urethral mucous membrane being torn, or the whole canal, indeed, sometimes fractured; are the most common causes of this description. The condition has been known to arise from chordee alone, unmeddled with. In these cases, there is usually profuse bleeding, and stricture is afterwards gradually formed.

All *force* in catheterism, sounding, lithotritry, *et id omne*, as might be inferred, is a powerful element in laying the foundation for obstinate stricture. No fitter warning could be extended to inexperienced¹ practitioners than the following: "Let an examination of a large proportion of the preparations of the disease (stricture) found in every museum, suffice to warn the young surgeon of the irreparable mischief he may in one short minute inflict by a transient loss of temper, or forgetfulness of the golden rule in catheterism, '*arte non vi*.'"²

External division of the urethra, unless carefully watched, and the proper amount of dilatation obtained by unremitting appliances, will almost inevitably cause extensive, troublesome, and often irremediable mischief.

When the penis is amputated by the knife or by disease, narrowing, at or near the external orifice, is very sure to happen, and will baffle the surgeon's best efforts if allowed to establish itself. Mr. Thompson predicates this effect from even cancerous ulceration of the organ, and refers to a specimen illustrative of the occurrence, contained in the museum of the Middlesex Hospital.³

Foreign bodies impacted in, or passing through the urethra, are often strongly obnoxious to the charge of exciting an inflammatory state, predisposing the part to subsequent constriction. Entire calculi, but far oftener the pieces passed after lithotritry, are especially of this nature. Occasionally, too, a stone may become badly lodged in a pouch formed behind a stricture, the latter preventing its escape. (See Fig. 52, p. 468.)

There are strictures from congenital malformation—the meatus

¹ And to some *experienced* ones.

² Thompson, pp. 130, 131.

³ ("No. xi. 27.")

being very narrow; or an abnormal fold of membrane may lie across the passage lower down.

Fig. 52.



Calculus lodged in the urethra.

We shall hereafter refer to stricture or obstruction arising from various morbid growths in the urethra.

Mr. Thompson, in an analysis of 220 cases of stricture, found 164 referrible to gonorrhœa; 28 to injury sustained in the perinæal region; 3 to cicatrizing of chancres; 1 to cicatrization after phagedæna; 6 to congenital malformation associated with decided irritability of the organs from childhood; 1 to poisoning from nitrate of potash; the same, each, to lithotritry and masturbation. Of true inflammatory strictures included in the above 220 cases, there

were 8; genuine spasmodic stricture from rectal irritation, 2; from undue acidity or alkalinity of the urine, 3; from no assignable cause, 2. (*Op. cit.*, p. 132.)

Gonorrhœa, as we see, bears away the palm; and next to it comes external injury to the perinæal region. Stricture following lithotomy is believed to be very rare, although its occurrence has been asserted.¹ The instance of the origin of the affection in an overdose of nitrate of potash, should be remarked, especially as this salt has so great a popularity, at present, in rheumatic affections. If the rheumatic diathesis be firmly established, we thus have two accredited influences tending to form urethral stricture.

The Tissues abnormally affected; Nature and extent of the Lesion; Certain more remote Effects; Usual number of Strictures.—The inflammatory action in the urethra is, of course, first manifested upon and in the mucous membrane. A congested state of the vessels, with

¹ By an "American surgeon," says Thompson. Perhaps he may mean Dr. Gross, who says (*op. cit.*, p. 775)—"The cicatrice left after lithotomy, especially when the operation has been followed by severe inflammation," is causative.

swelling of the membrane arising from it, is the primary effect; next, there is an albuminous exudation into the membrane itself, and this also infiltrates the subjacent tissues, constituting that œdematous state which results in the simple inflammatory stricture. Resolution usually follows, without any permanent change whatever. When frequent renewal of this action takes place, or when any particular attack occurs, serious changes of texture follow. What is termed "fibrillating lymph," is the first product of this more troublesome form of disease; the second is fibro-plastic material.¹

When these conditions obtain, the foundation of true, organic stricture is laid; the morbid product encircles the urethral canal; the submucous tissue becomes "glued" to, or conglomerated with, the mucous membrane; sometimes, not only are the submucous cellular meshes filled with the exudative material, but the fibrous coat of the spongiose body, or even its entire substance, is pervaded by it. At last, in inveterate cases, there is excessive hardness of the affected parts.

*Necroscopic Appearances.*²—Usually, no traces of congestion are observed upon the mucous membrane, which is no longer smooth and transparent, but of a dull colour, thickened, corrugated, and hardened. The gross appearances, of course, vary, according to the extent, chronicity, and previous management of the case, and thus the actual stricture may be comparatively superficial, or deep, wider or narrower, according to circumstances.

We may have a constriction of the mucous membrane, only; and the latter will then appear somewhat hypertrophied. The same is true of the "elastic fibres" beneath. Even in these slighter cases, there is more or less adhesion of the mucous membrane to the subjacent tissues, and it is nearly certain that this must always be a source of irritation, and aggravate both the symptoms and the essential lesions.

Proportionably to the severity of the case, the morbid material will be seen pervading the submucous web, destroying the involuntary muscular fibres, and when extreme, filling more or less of the

¹ By fibrillating lymph is meant a "fluid blastema, in which fibres make their appearance, apparently without any intervening cell-production, or agency;" fibro-plastic material is "an exudation in which nucleated corpuscles appear, which soon elongate, become fusiform, and then fibrous." Thompson (*op. cit.*, p. 59).

² Although so undoubtedly existing during life, these evidences must disappear at death. (Thompson.)

as large as a small orange, and which was, of course, very prominent during micturition.¹

More Remote Effects of Stricture; its Locality, Extent, etc.—To permanent stricture there must, sooner or later, succeed, first, slight dilatation, but next, very decided hypertrophy of the bladder, which organ finally becomes *columnar*, from the increase and interlacing of the muscular fibres; and not only are the latter thickened, but their connective tissue and the mucous membrane also. There are specimens showing a thickness of from half an inch to a whole inch for the vesical walls in this affection. Sacculation ensues, and the pouches sometimes attain an enormous size, occasionally overbalancing the bladder proper. A specimen of this last-named condition is preserved in the Cabinet of the Boston Society for Medical Improvement (No. 606).² While there is proof, by necroscopic inspection, of extreme contraction of the capacity of the bladder (and this is perhaps the most frequent state),³ usually preceded and accompanied by great vesical irritability, so there are instances of very marked general dilatation. In this the ureters often participate, and become of the circumference of the finger, the thumb, or even of the small intestine,⁴ their normal calibre being that of a straw or, at most, of a quill. In these abnormal circumstances, their walls may become somewhat thickened, and they are occasionally found coiled upon themselves. Gradually, the kidneys become diseased; their cavities being enlarged at first by fluid pressure, their texture is finally absorbed, and large pouches are sometimes formed.

The prostatic, as well as the seminal ducts, and the lacunæ, share in the affection, being more or less dilated; sometimes the entire prostate gland suppurates, or else several abscesses are formed in its substance. (Druitt.) In abnormal cavities of the prostate, as in

¹ The various lacunæ and openings of the ducts partake of the dilatation. A bougie or a catheter is often easily caught in these. The floor of the urethra is their place of election. Thompson and Cruveilhier state that calculous deposits are sometimes found in them. Anatomists signalize the "*lacuna magna*" seated in the upper wall of the urethra.

² See also Appendix, Note BB.

³ Druitt.

⁴ Specimen 599 (Boston Society for Medical Improvement Cabinet). "The ureter was so large as to be mistaken for the intestine, and, as such, was cut across near its lower termination. Cause of the dilatation not observed. From a dissecting-room subject." (*Catalogue*.)

the dilated lacunæ of the urethra, masses of mortar-like deposit are occasionally found. A concretion may also be developed in the urethra, around some entangled substance, particularly if there be

Fig. 53.



This engraving, from a preparation in the Middlesex Hospital Museum, represents the beginning, middle, and end of a fatal case of disease of the urinary organs. It shows a tight stricture about three inches from the extremity of the penis; the urethra dilated behind it; another stricture in the membranous portion; false passages and abscess around; the bladder contracted in size, but enormously thickened; the ureter dilated and tortuous, looking like an intestine; and the kidney expanded and atrophied, with scarcely any of its secreting substance remaining. (After DAVILL.)

a pouch-like dilatation of the canal. (Gross.) Mr. Thompson (*The Enlarged Prostate, etc. etc.*, London, 1858) asserts that a coexistence of stricture and senile prostatic enlargement is certainly rare. He does not think that the latter is ever caused by the urethral affection.

Locality of Stricture.—Found, according to some surgeons, in every part of the canal, stricture is, by others, limited to certain localities. Thus, observers have restricted it to the spongy and membranous portions; Hunter declared the vicinity of the bulb to be its most frequent seat; Sir Everard Home and Sir B. Brodie state that in the majority of cases it occurs just behind the bulb, but

they recognize four and a half and three and a half inches from, and at, or close to, the meatus, as other places affected; Mr. H. Smith found seventy-seven cases out of ninety-eight "anterior to the triangular ligament, and chiefly either in the bulbous portion of the canal or in front of it" (cited by Druitt); Leroy d'Etiolles places eighteen-twentieths of permanent strictures "immediately behind the bulb;" Vidal gives nearly the same opinion; Ollivier says the spot just front of the membranous portion, near its junction with the bulbous tract (*op. cit.*); Amussat selects the part "in front of the junction between the bulb and the membranous urethra" as most usually strictured; Civiale designates the extremity of the canal, from one to three inches down its track, and at five inches depth, as the localities generally affected. Hunter never saw prostatic stricture; Leroy d'Etiolles and Ricord have witnessed it.¹

Mr. Thompson,² from whom several of the above opinions are taken, after pointing out the errors likely to arise, when inches are given—from the different methods of admeasurement, *i. e.*, whether *post-mortem*, or during life—calls attention to the fact that nearly all authorities are agreed upon the locality, seemingly that of election for stricture, *viz.*, at the junction of the bulbous with the membranous portion—or very near to it—either posteriorly or anteriorly. Here, he continues, "the anterior layer of deep perinæal fascia comes into close relation with the urethra," and to this, in addition to the frequent spasmodic contractions of the voluntary muscles, specially³ manifested at this spot, favouring, as they do, permanent contraction, the large number of strictures found there is referrible.

Out of 320 strictures, derived from 270 specimens, 215 were found at the *sub-public curvature*; 51 at the centre of the spongy

¹ No one else appears to have observed it. Mr. Thompson, who examined three hundred specimens, in different museums, found none of this form. Narrowing of the urethra resulting from pressure by enlarged prostate, does not constitute stricture, properly speaking.

² This writer coincides with the large number of those who consider the vicinity of the bulb, the *lieu d'élection* of stricture; and, as is very reasonable, insists upon the method by *post-mortem* measurement, as the only correct one, when the locality is to be accurately determined. Mr. Liston's assertion that the favorite seat of stricture is "about four inches from the external meatus," is, in Mr. T.'s opinion, attributable to his measuring during life, from the external meatus, with a bougie—a method open to many sources of error.

³ Brodie.

portion, and 54 at the external orifice, and within two and a half inches of it. (Thompson.)

Number of Strictures in the same Individual; Extent of Stricture.—Usually single, stricture has been multiplied in single urethræ, to the numbers¹ 3^a, 4^b, 5^c, 6^d, 7^e, 8^f, and even 11^g.

Civiale says, that when there are more strictures than one, that seated near the curve of the canal (near the pubic arch), and which is pretty sure to exist, will be found the most serious, although there are striking exceptions to this rule.

Extent of Stricture, longitudinally.—It is very frequently only linear, like a thread, girding the canal. This is the simplest form; again, there is what is termed “membranous stricture,” constituted by a fold of membrane perforated centrally, or at one or other margin.² Folds of mucous membrane are also found running partially along one side of the urethra—either longitudinally, diagonally, or obliquely—the other side being entirely free.

These are the specimens known as *Bridle Strictures*.³ The latter term does not properly include the free threads, or bands, which are sometimes found.

Mr. Thompson refers to one example, where ten or eleven were found in one urethra;⁴ and he believes they may sometimes be caused by instruments, and thus be, in fact, short “false passages.” When old and neglected, the strictured part may be from a few millimètres, to one, two, and three⁵ centimètres in length. (Ollivier.) The amount of transversal thickening cannot be estimated upon any average, so great is the diversity noticed.

¹ a. Boyer; Thompson. b. Thompson; Rokitansky. c. Ducamp (according to him, there are rarely more than two). d. Hunter. e. Lallemand (Ollivier, *Dict. de Méd.*, only allows him five—by error, doubtless). f. Colot. g. Leroy d’Etiolles. Thompson says that the latter statement is not founded on *post-mortem* examination, but that the number was estimated, during life, by “a small gum-elastic sound.” It is referred by him rather to “a series of irregular contractions,” than to true stricture.

² Ollivier alludes to these as not very rare. He describes them as linear bulgings—of greater or less extent—forming from the top, sides, or bottom of the urethra. They resemble the spurs seen within certain bloodvessels. Rougier thought that natural folds of the mucous membrane were occasionally mistaken for bridle strictures. Ducamp and Amussat testify to their real existence. They are sometimes called “whip-cord,” or “annular” strictures.

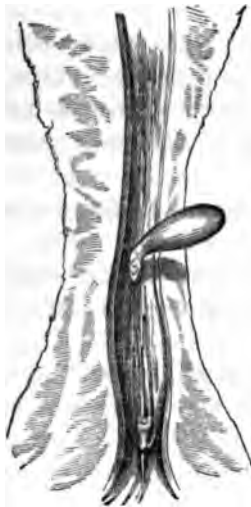
³ So named by Sir Charles Bell.

⁴ In the Museum of Saint Bartholomew’s Hospital.

⁵ A millimètre is .03937 of an English inch; a centimètre .39371 of an English inch.

II. CARUNCULAR AND CELLULO-VASCULAR GROWTHS; POLYPOUS EXCRESCENCES OF THE URETHRA.¹

Symptoms somewhat analogous to those of stricture may occasionally excite the suspicion of its presence, when caruncular and polypoid bodies are developed in the urethra. The idea would now, however, be only temporarily entertained, although formerly very much of urethral obstruction was referred to these growths. That they do occasionally exist, is proved by specimens, but these, as well as accounts of such cases, are very rare.



Polypoid urethral growth. 9 lines long by 3 or 4 broad. Museum of Guy's Hospital. (From Mr. Thompson's Work.)

The polypous formations found, are, in general, merely prolongations of the mucous membrane. Rokitsansky alludes to them under the terms mucous, cellular, or vesicular, polypus. Their usual shape is that almost peculiar to polypi; rounded, thick, and blunt at the free extremity, with a tapering pedicle, continuous with, and in fact formed from, the mucous membrane.² Mr. Thompson gives a very plausible explanation of the infrequency of their existence in the urethra—if Rokitsansky's theory of their production be adopted, viz., that by gradual hypertrophy of the mucous membrane, and of the tissue just beneath it, a tumour is formed, which gradually drops down into the cavity of the containing organ, and drags out the mucous membrane with it, as at once its pedicle and its covering. The urethra, therefore, when at rest, being a closed cavity or tube, affords no space for their development. They are consequently oftenest found in the prostatic portion, and "there, usually tending towards the bladder, or pendant within it."³

It is concluded, on careful observation, that morbid growths in

¹ In close relation to stricture.

² See the drawing.

³ Thompson, *op. cit.*, 79.

the urethra are so rare, that the rate of their occurrence, independently, is hardly one in a hundred cases. The granulated condition of ulcerated or wounded surfaces, common enough near old stricture, does not belong to this category of lesions; it is next in frequency to the vascular growths about to be mentioned.

Vascular excrescences are observed in the anterior portion of the urethra,¹ and not infrequently just at the meatus, and are apparently analogous to florid red granulations in other parts. Their texture is soft, they bleed freely on being touched, are of a very bright red colour, and not extremely sensitive. Obstruction to the urinary flow by these growths is believed to be an exceedingly rare occurrence. Mr. Thompson has collected several examples; but there are not more than one or two specimens recorded as observed by any single surgeon amongst those he quotes.²

His own observation has only afforded him one instance of a granular red growth "springing from behind the urethral orifice," and protruding thence. This, together with warts on the glans penis, followed neglected gonorrhœa, and balanitis; the growth, except for its deeper redness, was similar in structure to the warts. No true *caruncular* growth was ever met with by him.

Tubercular and cancerous nodules are very rarely encountered in the urethra, nor are they, thus far, known to have been remarked as primary growths or depositions; a similar affection of the urethra is observed to follow such disease in the other urinary, or the related organs. The inverse order to that in which we have considered these morbid growths, is that of their frequency.

Varicose Narrowing of the Urethra.—This cause of urethral narrowing is certainly very rare; some even doubt its existence. Scemmering observed the condition, and particularly in those ad-

¹ The *fossa navicularis* is the most usual seat.

² Thus, Hunter mentions two cases; Sir C. Bell speaks of "occasionally" seeing little white, warty excrescences; Arnaud (1769) and Morgagni refer to them; the former records three cases, one being a polypus, which protruded nearly half an inch from the urethra. Morgagni has but one case. Pascal speaks of two soldiers whose urethræ were filled with "fungous and callous excrescences," and attributes death to this condition. Amussat, Civiale, Lallemand, Velpeau (two cases); Ricord, Chelius (one only); Rokitansky (rarely); H. B. Norman and Guthrie are cited as observers of this abnormal condition. Ollivier acknowledges the occurrence of these various growths, and refers them—as Thompson and others do—to the *fossa navicularis*; he adds that they are sometimes found in other parts of the canal. Their existence is denied by Brunner, Mèry, Garengot, J. L. Petit, Desault, and many others. Scemmering and Baillie offer proof of their occasional presence.

dicted to venereal excesses. Ollivier seems to doubt whether the authorities referred to by Scëmmering had ever demonstrated the reality of the state under consideration by necroscopic examinations; and, for himself, whilst he does not deny its possibility, he has never seen anything demonstrative of it.

Prognosis of Organic, Permanent Stricture.—Stricture is difficult of cure according as it is chronic or acute, annular, extensive, and indurated, or in the "bridle" or valvular form. If very old and neglected, there will be great difficulty in restoring to the canal its freedom of calibre; and the patient must suffer much annoyance and pain in the process. A constriction which completely and firmly surrounds the urethra, is, of course, more difficult to remove than any partial, thinner, or less firmly organized obstruction. There are, moreover, many unfortunate complications and results which aggravate the patient's condition, and often occasion an unfavourable prognosis. In addition to difficult micturition, requiring sometimes such unusual efforts, that hernia is induced, we may have complete retention of urine, even necessitating puncture of the bladder.

Patients sometimes become discouraged and hypochondriacal. Others are affected, as an evident consequence, with orchitis, cystitis, prostatitis, abscess, and fistulæ. Death may even happen from suppurative inflammation gradually extending to the ureters and kidneys.

The usual gravity of prognosis in urethral stricture, is moreover aggravated by the frequent neglect of the condition on the part of patients; by the difficulty often experienced in curing it, and by the tendency toward renewal of the constriction. The older a stricture is, and the more the fibrous change predominates, the harder it is to cure. Valvular, and bridle-strictures are much more easily destroyed than those of any other form; and the stricture resulting from loss of substance of the urethra and adjacent tissues, is one of the most difficult to remedy.¹

Treatment of Organic, Permanent Stricture.—Three methods are now recognized by practitioners as best suited to the treatment of stricture, viz., dilatation; destruction of the girding tissues

¹ Ollivier.

by chemical agency, or their division by incisions; understanding, of course, *after-treatment*, to permanently establish the freedom obtained.

These are the direct indications, all constitutional disorder must be previously attended to,¹ unless the constriction be so complete and imperative that there is no time for delay. In this event, the very urgent symptom is *complete retention of urine*. This comes on in what is termed by Mr. Druitt the second stage of permanent stricture, when an irritable state of the bladder has become established, and spasm accompanies; and also in the purely spasmodic and inflammatory forms. Its management will be referred to under the head of Spasmodic Stricture.

Dilatation.—This is effected with elastic or firm sounds,² or with thin membranous cylinders,³ dilated with air or water; and its object is to restore the constricted portion of the canal, as nearly as possible, to its natural calibre. When this is effected, the cure is completed by subsequently passing a bougie at intervals; and this last measure applies to every method used.

Dilatation has always obtained the preference, when practicable. Much patience, ingenuity, and tact are required; and a careful and gentle course will succeed far better than the use of *force*, which, in most cases, completely defeats the operator's intention, besides putting his patient to great and unnecessary suffering.

Best Methods of Procedure.—A bougie or metallic sound, such as will pass the stricture (supposing the latter to be single, and seated at or near the most usual portion, *i. e.*, the junction of the bulbous and membranous tracts), is introduced, and allowed to remain a few minutes. The size of this sound being recorded on its withdrawal, the patient is allowed a respite of from three to four days; the same sound is then reintroduced, and, if it pass easily, the next larger one is tried. Should the first not pass freely, on trial, let it remain for a few minutes in the canal before using a larger one.⁴

¹ All disordered states of the urine, chronic cystitis, and disease or disturbed function of the digestive organs, require attention and remedial measures. All violent exercise, and especially on horseback, is to be avoided.

² Such are the bougies made of wax, gum-elastic, gutta-percha, ivory, cat-gut, and metal sounds, either flexible or otherwise.

³ Thompson.

⁴ Five or six at first, gradually increasing to ten or fifteen, etc. Druitt, Thompson, *et al.*

The latter introduced, may remain ten or fifteen minutes. Another three days' interval, and the process is repeated. This course is continued until the dilatation is effected. Mr. Druitt remarks that a sufficient number of trials "affords, in most cases, an easy, painless cure."

In very irritable urethræ, and if (as often happens) there be chills, or slight rigors, with nausea and faintness on passing the catheter for the first time, a longer interval may be allowed; and, in the mean time, all causes of dietetic disturbance should be avoided; the bowels must be maintained in a free condition; and if there be any seeming tendency to periodic recurrence of the chills and other symptoms mentioned, quinine may be given, in the dose of two or three grains, twice daily. Quietude should be enjoined upon patients affected with stricture, both shortly previous to, and after the beginning of treatment.

In the intervals of instrumentation, it is advisable promptly to treat symptoms of either constitutional or local irritation. A too acid urine should be corrected. The *liquor potassæ*, or¹ an effervescing draught, with citrate of potash, and hyoscyamus or opium, will be found of great service. Generally, patients soon bear sounding well, the sensibility of the urethra becoming somewhat deadened.

By degrees, sounds as high as Nos. 10, 11, and even 13, may be reached. A very fair calibre is attainable by No. 11; but if that pass easily, and does not annoy the patient, 12, and even 13, are advised. Usually, whatever bougie or sound will enter the external urethral orifice, without force and stretching, will traverse the canal. (*Vide* page 457.)

The passage, when dilated, *must be kept so*; there is often a tendency to recontract. The *bougies à ventre*, or those bellying out at about two inches from their points, have been lauded by the French surgeons as effecting this purpose, by keeping even more dilating force at work than is absolutely necessary—somewhat on the principle that we cannot get too much of a good thing. Mr. Thompson and others think that not only is the object not effected, but a risk is incurred of injuring the canal by excess of pressure. The ordinary dilatation is more advisable, and may be continued or relaxed at the discretion of the surgeon, who cannot safely leave matters in

¹ Thompson.

the power of his patient, even with the fairest promises on the part of the latter to be faithful in using the bougie. The urgent symptoms being relieved, the necessity for keeping up remedial action does not, in this, any more than in many other maladies, impress the uninstructed.¹

Method of passing the Bougie or Sound. How is it known whether the Stricture is traversed by them?—Taking the *corona glandis* in the left hand, and holding the oiled bougie (bent into catheter form, if pliable) “loosely like a pen”² with the right, it is passed cautiously and gently into the urethra,³ turning the penis somewhat between the fingers so as to efface the folds of mucous membrane. On meeting any obstacle, it is slightly withdrawn and then again introduced. If it goes on for some distance, apparently unarrested, we may know, by releasing it for a moment, whether it has penetrated the stricture. If it has, it will be retained (“held,” as surgeons term it) more or less firmly; if not, it will recoil (if an elastic bougie—a sound will be left loose and easily movable), showing that it has failed to pass, but has become bent upon itself against the stricture. Failure of any reasonable number of trials, and of any proper force, with the elastic bougie, should lead us to the use of the firm sound. Sometimes, by pressing down, with the finger of the right hand, the portion of the canal where the obstruction to the passage of the bougie commences, we succeed in passing it. The finger in the rectum sometimes assists us by reaching the portion where the arrest occurs. (Ollivier.)

Cases in which the Sound is preferable.—In old, obstinate stricture, with hard, “gristly,” fibrous parietes; very irritable urethræ; and those where there are troublesome false passages. (Druitt.) When the urethra is not deviated from its usual course, or only very slightly, and the track is well known to the surgeon—or, if not perfectly so, it is deemed best to keep that which is natural to the canal—firm metallic sounds are best. In cases where the operator is inexperienced, or there are such obstructions as that an elastic instrument will make its own way better than if forcibly guided by

¹ Mr. Thompson thinks it not safe to intrust any of the after treatment to the patient, however intelligent, when the stricture is posterior to the bulb.

² Druitt.

³ Thompson says that the patient should not urinate for at least an hour before the operation.—“The patient should pass water just before.” (Ollivier.)

the surgeon—like a horse in a dark night, who finds the road which his driver cannot see—elastic bougies are much the best.¹ Such cases, however, are rare, and all surgeons prefer to use a sound which they can control.

Narrow Difficult Stricture.—The size of the stream of urine is a tolerably correct criterion for the size of a bougie or sound. Choosing a sound nearly of the calibre, and avoiding the floor of the urethra—as liable, from enlarged lacunæ, to catch the instrument—it is tried. A steady, determined endeavour to pass the constriction is far better than restless changing of the direction, or any great force. A slight holding of even the point of the bougie encourages the surgeon, and a few minutes' patient waiting may engage it still further, when, at all events, a beginning is made. It may be aided in its passage, as previously hinted, by introducing the left forefinger into the rectum. Attempts at passing what may be termed a difficult stricture, should not, at first, be too long continued, lest inflammation be aroused. Fifteen or twenty minutes are mentioned as a suitable limit. Three or four days subsequently, a renewal of the attempt is safe and desirable.

"Impassable" stricture, as it is sometimes called, is often effectually opened by pressure with silver or other solid sounds, pressed, for from five to ten or fifteen minutes, once in every three or four days, against the stricture. The sound, says Mr. Druitt, should be small, about one-fifth or one-sixth of an inch in diameter, or else it should be conical. The pressure of its point should be chiefly directed against the upper portion of the canal. If conical sounds be used, the point of one may be kept against, or perhaps slightly engaged in (if possible) the obstruction, during some two hours.

Dupuytren was in the habit of fixing a bougie against strictures which did not yield to proper management or force, and leaving the patient thus, for from twelve to twenty-four hours. Very frequently, at the next visit, the point of the instrument would be found engaged in the stricture, and the subsequent treatment was easy.² In rebellious cases, and especially where there is either original or excited inflammation, it is advisable to use antiphlogistics

¹ Thompson.

² Mr. Liston violently condemned this practice; but Velpeau, Guthrie, Thompson and others, speak highly of it. A short gum-elastic catheter, attached by tapes, in the usual way, is recommended. This is sometimes termed "vital dilatation."

and warm baths; relaxation is sometimes greatly advanced by these means.¹

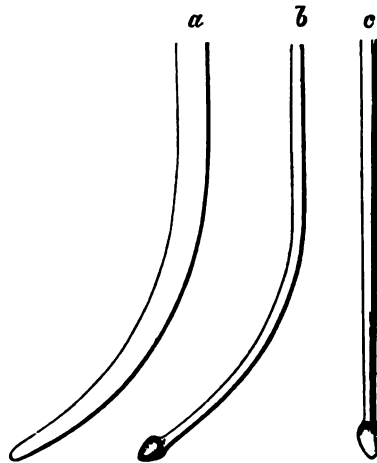
A "set" of conical sounds consists of *three*. They are made of solid metal, and polished, and are to be graduated from their points upwards; as, from the ordinary No. 1 bougie (at the point) to Nos. 2, 3, or 4. The *second* sound begins with size No. 2 or 3, and goes to No. 6; the *third*, at No. 5, and ascends to 8 or 9. The conical part is confined to the extreme point and a short space above it.

In very irregular, tortuous urethræ, when other models have failed, small, flexible bougies will sometimes succeed. These have even been "twisted" into a *quasi* "corkscrew" form,² and *turned* into the gyratory

track.⁴ Much confidence may be accorded to these, from the recommendation of so high an authority as Leroy d'Etiolles.⁵

Method by Retained Catheter.—Allusion has already been made to this method; which, however, deserves more extended notice. Some refer to it as "extremely speedy and efficient," and counsel its employment, especially in cases where time is of importance; in very indurated, cartilaginous constrictions; in very irregular urethræ, or when false passages have been made. It has also seemed best suited to those instances of excessively irritable urethræ, said to be most common in persons who live, or have lived in tropical

Fig. 55.



Conical sounds for stricture. (After THOMPSON.)

¹ Ollivier. (*Op cit.*)

² Thompson.

³ Ibid.

⁴ The ingenious expedient of Dr. Henry J. Bigelow, Professor of Surgery in Harvard University, may appropriately be referred to in this connection. It is useful diagnostically and remedially. The *form* of the stricture is ascertained, and its *site*, by impressions obtained upon gutta-percha bougies softened in warm water. When cooled, these afford a guide to the surgeon in future operative measures. (See *Boston Med. and Surg. Journal*, February 7th, 1849.) Mr. Thompson, without cause, we think, depreciates the plan.

⁵ Sur les Avantages des Bougies tortillées et crochues dans les Retrecissemens, etc. etc. Paris, 1852.

climates, and in whom chills and fever follow the excretion of urine when the common bougie is used.¹ The instrument must be small, and it is best when made of pure silver, as being the material smoothest and least offensive to the urethra. It is to be retained in the canal for two or three days, being fastened by tapes, either to the penis, by sticking-plaster, or to the thighs, or attached to a strap passed around the waist. A larger catheter is passed frequently—after a certain amount of dilatation is effected by the first instrument—and the latter process is accomplished partly by a suppurative, partly by a directly expanding action.

To leave a catheter very long *in situ*, exposes the patient to suffering by the irritation it is nearly sure to excite, and it is now deemed the best practice to dilate *gradually*, and by renewed operations. Ollivier remarks, writing of *bougies à demeure*, that the majority of surgeons seem agreed that they are unadvisable. If used, he recommends half or three-quarters of an hour, as the longest period, *at first*, to leave them in the canal, and then increases the time to two and three hours; continuing the process, on an average, for six weeks.² This is, in fact, gradual dilatation.

If, as sometimes happens, orchitis threaten, or actually supervene, the catheter must be removed, and the complication treated as usual. Should very great pain follow the first introduction of the catheter, *opiates*, with diluents, should be given. If the urine be *acid*, carbonate of soda or the bicarbonate of potash should be added to the above-named remedies; if an alkaline state of the secretion be noted, dilute nitric acid or the nitro-muriatic acid, forty minims to a pint of the liquid employed as a vehicle, should be used. (Thompson.)

Rapid or Forced Dilatation.—In general, this procedure is banished from modern surgery; it should be entirely abandoned. In certain desperate cases of retention of urine, the sound (and especially a conical one) has been pushed through a stricture. But even puncture of the bladder is better than such forced passages. The surgeon is liable to make false routes; to have troublesome lacerations and hæmorrhage; great pain is caused, unless anæsthesia be induced, and even then the operation is unjustifiable. M.

¹ Druitt; Thompson.

² Sometimes less, sometimes more time is required. Two or three months is a not uncommon period for the cure of *old* strictures, by this method.

Mayor's large sounds,¹ used with similar intent, are included in the same category.

Inflammation of the urethra and bladder, and the aggravation of any existing renal disease, with the occasional occurrence of phlebitis and purulent infection (which sometimes follow tearing of the urethra by lithotrites), are some of the sequelæ of forced dilatation.²

Dr. James Arnott,³ in 1819, recommended the passing of a varnished silk tube through such strictures as would admit of it, and then injecting, by a syringe, water, mucilaginous liquids, and air. No stricture through which the silk tube can be passed is a very close one, and the sound or bougie would be the preferable mode of dilatation.

Method by Injections.—Oil has been introduced into the urethra and pressed by the fingers downwards till the stricture was reached. First tried by Scëmmering, it was subsequently practised by M. Despiney, of Bourg, in 1822, by M. Citadini, in 1826; and M. Amussat used warm water, by means of an elastic bottle, to force it against the constriction.⁴ Utterly powerless in cases of organic permanent stricture, or, at all events, only slight aids to dilatation, injections have been proved of service in instances where mucous plugs behind the stricture can be reached and softened by them. When a bougie is so strongly infixed that it cannot be extricated, and thus artificial retention of urine is feared, they have enabled the surgeon to extract it.⁵

Tubular Treatment of Stricture.—Mr. Thomas Wakley read an important paper before the Medical Society of London, November 22d, 1856, "On the Tubular Treatment of Strictures of the Urethra and other Mucous Canals." The paper was published in the *Lancet*, November 29th, 1856, and contains the results of this method as exhibited by abstracts of a few cases, and also a

¹ Mayor's sounds were six in number; dilatation *by force* was the mode of using them. M. Sédillot, referring to them, says: "This method, experimentally, has not proved advantageous, and does not seem suited to old and firm organic strictures. I have actually caused extravasation of blood, which assumed an annular form, in the case of one patient; and had I used any more force, the urethra would inevitably have been ruptured. These sounds, however, are serviceable in retention of urine from enlarged prostate." (*Médecine Opératoire*, p. 925.)

² Coulson; Thompson. See extended remarks upon the subject in the *Lancet*, vol. i. p. 562.

³ Strictures of the Urethra.

⁴ Sédillot; Ollivier.

⁵ Amussat, *Gazette Médicale*, 1836.

description of the instruments and manipulations. Mr. Wakley's plan has been widely tried, and, so far, has met with gratifying success. We quite lately observed a favourable report upon it in a French medical journal. Mr. Wakley mentions the names of many distinguished surgeons who have highly commended the instruments he has devised. The latter are three "guides" of different sizes, eleven silver dilating tubes, and the same number of flexible tubes. The guides are numbered 1, 3, and 5. A guide consists of a hollow silver director, thirteen inches in length, straight, excepting near the end, which is slightly curved, the extremity being closed and rounded, and having an aperture at one side. A movable handle is fitted to it for assisting its introduction into the bladder; when this has been effected the handle is removed, and a steel rod of the same size, five inches in length, is fixed into the external extremity of the director by one turn of a screw. This now forms the urethral director, over which the tubes are made to pass.

"The silver tubes are nine inches in length and straight, the opening at the vesical extremity being bevelled off and exactly adjusted to the surface of the guides. The upper end terminates in two flanges, for being worked with the fingers and thumb.

"The flexible tubes are manufactured of gum-elastic, lined with flexible metal, and are ten and a half inches long, conical towards their points. Like the silver tubes, they glide over the guide with the greatest precision. Their upper end is furnished with a silver collar and rings to enable their being secured in the urethra. Both the flexible and the silver tubes are numbered, and work upon their corresponding guides.

"Before using the instruments, two or three days should be occupied in preparing the patient for the operation. Opportunity should be also taken of examining the urine, and obtaining a clear history of the malady. By examining the urine, of course an elaborate quantitative or qualitative analysis is not meant; but the specific gravity of the urine should be ascertained, its reaction determined, and it should be examined for vesical mucus or pus, and the products of calculi. It is necessary to be the more particular with respect to these preliminary measures, in proportion to the severity or complications of the case. Cushions, made of Hooper's prepared India-rubber, containing hot water, should be applied to the region of the bladder above the pubis, and also

against the perinæum. The urethra should be carefully examined with a guide suited to its calibre, and the necessity cannot be too strongly urged of carrying the point of the instrument along its anterior surface. With patience and perseverance, aided by the usual dexterity which a surgeon should possess, the instrument will be passed through the stricture. This step having been accomplished, the movable handle of the guide is to be withdrawn, the index-rod screwed on, and a corresponding silver tube passed upon the guide through the stricture. It will be observed that the guides are straighter than the catheters used by the late Mr. Liston, and they are made so as to allow the urethra to be straightened as much as possible, which is effected by making a fulcrum of the triangular ligament, the penis being brought rather lower than at a right angle to the body. By this mode of proceeding, the tubes are easily passed to the neck of the bladder. Having sufficiently expanded the stricture, the last used silver tube is withdrawn, and a flexible one is then passed over the guide, which should be immediately withdrawn through it.

"This is commonly a very easy proceeding, and requires no further manipulation than a rotatory motion of the instrument given to it by means of its flanges." Mr. Wakley goes on to say that the flexible tubes glide easily by reason of their construction. The next step is to discharge the urine, when the surgeon gently and partially withdraws the tube, at his discretion as regards the distance, so that only a small portion of its vesical end may project within the bladder; this prevents irritation of the mucous coat, and the troublesome rigors so often concomitant when the point of an instrument is left in contact with the inner coat of the viscus. Thus, also, is the risk of ulceration and perforation avoided.

When the urine has been discharged, the tube is to be plugged, and then secured by tapes passed through the flanges of the instrument, the point of the latter being carefully maintained in the safe position above indicated. The tapes are to be "tied around a broad piece of India-rubber, which should encircle the penis. The knees of the patient should be raised and supported by pillows placed underneath them, the India-rubber bags containing hot water being used as before stated."

Mr. Wakley directs the flexible tube to be retained for twelve hours, provided there has been no disturbance excited by it. Before withdrawing it, the "guide" must be re-introduced through

it; then the appropriate metallic tubes are to be passed, and a *larger* flexible tube introduced and kept in the passage, in the manner already described. A hard, cartilaginous stricture, says Mr. W., has been dilated by this process in seven days, so that a No. 12 sound or catheter could be easily passed. As a rule, he advises two weeks as the time to be allowed before trying the sound.

This method was first proposed by Mr. Wakley in 1851, and has enlisted many of the best surgeons in its favour. The late Mr. Guthrie, Mr. Fergusson, Mr. Solly, Mr. Keate, Mr. Crampton, Mr. Coulson, Mr. Lizars, and Mr. Liddell are mentioned.

Mr. Wakley has a late article, in relation to his peculiar method, in the *Lancet*, January 30th, 1858, and which is to be continued. He speaks of the impossibility of causing hæmorrhage by his instruments, or of making false passages—certainly two grand *desiderata*. He also says: "The tubes are peculiarly adapted for the *obliteration* of false passages. The facility with which the *bladder* can discharge its contents through the tubes is also of incalculable advantage and great comfort to the patient. Many sources of irritation may thus be obviated, which would not pass through the eye of the catheter or bougie." By the pressure of the tube upon the contracted urethra, the sensitive lining recovers itself before the next discharge of urine, and the troublesome *rigors*, so common in patients who have stricture, as well as other "constitutional disturbances," are avoided.

Local Adjuvants to the Operation.—Anæsthetics may be usefully resorted to in cases where great pain is likely to be produced, and indeed in any attended with much difficulty; especially where great sensitiveness to the passage of the sound, bougie, or catheter, exists. The insensible condition, however, should not render the surgeon more willing to use *force* in passing the stricture; and one of the chief objections to the employment of anæsthetic agents is the lack of demonstration, on the patient's part, of the occurrence of misdirected or excessive pressure.

The use of belladonna ointment upon bougies has been favourably commented upon both in England¹ and France² as relaxative, to a certain extent, of stricture. Whilst in spasmodic affections of the passage it may reasonably be supposed effective, its asserted

¹ Tyrell.

² Velpeau.

action upon old, extensive stricture, is rendered doubtful or of minor value, from the fact that other means were simultaneously tried, such as the warm bath, etc. etc. Fairly to test any agency supposed to be possessed by it, an isolated trial is requisite.

Too much cannot be said in favour of dietetic regulations, and endeavours to rectify abnormal states of the digestion and of the urine. If there be evidence of a loaded or congested condition of the pelvic viscera, whatever means can be safely applied to lessen it, should be employed.

Moderate purgation, baths, and friction of the skin, so as to maintain the freedom of its functions, are decided adjuvants. Morbid conditions of the urine are to be corrected by the treatment spoken of in previous pages. The alkaline constitution of this secretion, with deposit of triple phosphate, although it can usually be obviated by the mineral acids, with buchu, uva ursi, etc., indicates a general tonic management, with a nourishing, though not a stimulating, diet.

Caustics in the Treatment of Stricture.—Although dilatation by sounds, alone, is successful in the majority of cases, there are those in which, even if temporarily triumphant, constant recurrence necessitates so frequent a use of the bougie, that both the surgeon and the patient are likely to have their patience exhausted, and perhaps the constitution of the latter may be seriously impaired.

Chemical agents, therefore, have been brought to bear upon such cases; and cutting-instruments, of much ingenuity and variety of form, devised for their treatment.

Escharotics and pointed instruments were used in the 16th century; and Henry the Fourth had the advantage of both methods at the hands of Mayerne and Loyseau. Ambrose Paré gives a quaint and particular description both of cutting-instruments and caustic-holders—the latter being “a pipe or catheter, having holes in the sides thereof”—and Wiseman followed with a similar practice in the latter part of the 17th century.¹

At the present day, chemical agents are not much in vogue—still,

¹ For an interesting account of this subject, historically, see Thompson's work, already cited. The following surgeons are also mentioned as having, more or less, tried this method: Hunter, Sir E. Home, Whately, Phillips, Wade, Ducamp, Lallemand, Ségalas, Leroy d'Etiolles. Sir Charles Bell gave a modified opinion—he advocated caustics—but not for strictures more than half an inch long.

cases occur where they have important influence; even if not carried to a decided escharotic extent.

Caustics employed; their Management and Effects.—Both potassa fusa and nitrate of silver are used. On the authority of Mr. Wade, of London,¹ a decided advocate of the method, the following conditions of stricture are particularly suited to the caustic treatment. Hard, cartilaginous constrictions, impassable by any reasonable force; old hard strictures which easily bleed on being touched by the sound, although the latter² may become engaged in them; irritable and spasmodic strictures—unless acute inflammation accompany the latter; obstinately recurring strictures—simple dilatation failing to complete a cure.

Mode of Using Potassa Fusa.—A soft bougie, with a hole in its point, is armed with a small portion of the caustic—on an average, $\frac{1}{8}$ of a grain—never more than a grain;³ and the margin of the aperture in the bougie is made to enclose the portion selected, so that it will not project, but will rest against the *upper*, rather than the lower part of the stricture, and the instrument is then passed, as quickly as possible, down to the part affected, and held against it steadily, but not very strongly, for from *one to three minutes*, according to the nature of the obstruction. At the first trial, the shortest period named is best, especially if the part be sensitive or bleed freely. Rapid and extensive destruction of the morbidly affected portions is not the intention, but “an alterative and absorbefacient effect,”⁴ or “a solvent agency,” exerted upon the tissues against which the caustic rests.⁵ Sloughing of the parts, therefore, should not be induced; and any evidence of its occurrence, from the action of the caustic, should be considered the result of error or mischance. The agent is to be regarded rather as an aid to dilatation—by modifying the sensibility of the canal—than as the sole curative means.⁶

Nitrate of Silver.—As now employed, this substance is chiefly efficient by its power of diminishing the morbid sensitiveness of the

¹ On Stricture of the Urethra, London, 1849. ² Or even if a small bougie pass.

³ Wade. His method is the same as Whately's—recommended by Thompson. Wade, however, uses a larger quantity; Whately only took the twelfth of a grain.

⁴ Drutt.

⁵ Whately.

⁶ Mr. Phillips, Mr. Thompson, and most others thus consider caustics.—Sir B. Brodie and Mr. Guthrie rarely advise caustics, and concur with Sir Charles Bell that all strictures above half an inch in length, are unfit to be attacked by them.

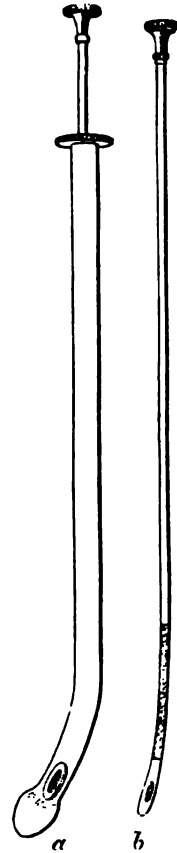
parts, and thus aiding the efforts at dilatation by the bougie or sound.

Sometimes, if moderately used, both as to quantity and force of pressure, great relief is experienced, even after one application. Excessive applications induce inflammation, with consequent pain and aggravation of the original difficulty. The stricture will either grow harder and more rebellious, or there may be abscess, retention of urine, violent bleeding, rigors, or false passage.

The instrument, and the mode of using it, appertaining to Leroy d'Etiolles, take precedence of those devised by Lallemand, Ségalas, and others. The instrument consists of a canula, small enough to pass the strictured portion, and having an olive-shaped extremity, near to which are two or three lateral apertures. Within the canula, a "flexible stilette," armed with nitrate of silver, is passed down to the strictured portion, and the caustic rotated, so as to bring it against the part presenting at the apertures. If the stricture be very small, two or three armed stilettes will be necessary in succession, in order to act sufficiently upon the constriction. The method is termed by its inventor the "lateral retrograde cauterization." (Fig. 56.) It is found that dilatation, after the action of caustics, is nearly or quite as requisite as if they had not been used. Strong testimony is adduced to prove the tendency to recurrence to be scarcely less than in the other class of cases.

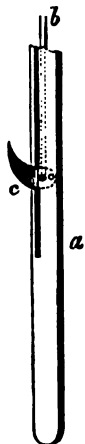
We find, then, that caustics, escharotically used, and with force, are wholly inadvisable; that potassa fusa must be employed in very minute quantity, if used at all, because so potent, and often so unmanageable; that nitrate of silver is useful, especially as a *modifying* means, when the urethral mucous surface is very sensitive, too vascular, or prone to hæmorrhage; and that these powerful agents should be looked upon rather as aids than as principals.

Fig. 56.



Leroy d'Etiolles' porte caustique, for "lateral retrograde cauterization."—
a. The canula. b. The caustic-holder.

Fig. 57.



Reybard's urethrotome. Argenteuil Prize, 1853. Acad. Impér. de Méd. (Paris.) *a*. The canula; it may be curved or straight, as required. There is a slit in it, in which the blade moves. *b*. Stilette connected with *c*, the blade. This is represented rather wider and considerably shorter than it is in the original. The parts within the canula are expressed by dotted lines. *Op. cit.* (From THOMPSON'S Work.)

Division of Stricture by Cutting or Puncturing Instruments.—Two methods are in use—the internal¹ and external. Lancetted stilettes or urethrotomes² are the instruments.

The most approved form for an instrument of a cutting nature, to be used internally, is one which divides the tissues as it is withdrawn, not one which is to be *pushed* through the contracted part. Mr. Thompson believes it very rarely necessary to use one of these instruments without a guide;³ to cut blindly in such a passage is worse than to open it from without.

The cases where instruments for internal division are necessary, dilatation being ineffectual, are those where the stricture is anterior to the scrotum. In this locality, wounds made from without are most usually slow in healing, and fistulæ are prone to form.

In cases where dilatation and caustic have both been inefficient, the urethrotome may be tried. Mr. Thompson indicates the anterior three or four inches of the canal as the locality for strictures of this sort, likely to be benefited by internal division, and insists that a *small extent* of constriction, longitudinally, is an essential element of success.

If division be resolved upon in strictures nearer the bulb, a with-

¹ Used, as already stated, in conjunction with caustics, in the sixteenth century.

² There are various forms, planned in England, France, and elsewhere. Mr. Fergusson's is quite popular. Dr. Physick, of Philadelphia, devised an instrument for internal use in 1813. Mr. Stafford's lancetted stilette was brought forward in 1827. Mr. Thompson notices several; that of M. Reybard, approved by the Imperial Academy of Medicine, at Paris, he does not think an improvement upon those which cut less deeply. (*Op. cit.*, p. 230.)

³ Generally, says he, the narrowest stricture, at all passable, will allow the entrance of a "guide" of some sort, prior to the urethrotome.

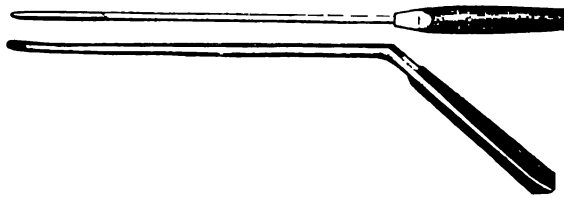
⁴ Mr. Thompson thinks that Reybard's instrument (especially the original pattern) makes altogether too deep an incision.

drawing blade should be used, not a propelled one; and two or three slight incisions are better than a single very bold one. Great extent of the stricture, and its distance from the *meatus externus*, increase both the difficulty and the dangers of the operation.

External Incision.—It is not now disputed that certain cases arise, in which neither of the methods hitherto described is adequate to remedy stricture. When the constricted portion is very extensive, occupying a great part of the urethral track, longitudinally, this operation is not only advisable, but, in many instances, imperatively demanded. The same is true in very irritable strictures, which do not allow of protracted efforts at dilatation, and in some where the latter method does not effect the relief expected; also, when fistulæ exist near the middle line of the canal, and can thus be cured at the same time, external division is indicated.

We once witnessed a successful operation of this sort where there

Fig. 58.



Long, straight director, with a narrow, short blade adapted to its groove.

were three or four fistulæ, and the strictured portion was quite extensive (so far as we remember, nearly two inches); the disease was occasioned by neglected gonorrhœa, the patient being at sea.

In bad strictures from traumatic causes, this operation has been found the best, and often the only one of permanent value; for such cases, even if at first amenable to treatment by dilatation, nearly always demand more decided measures at last. So, in cases where the general health is failing, from the effects of pain and the obstinate persistence of the malady, time and further constitutional injury are saved to the patient. We have abundant evidence that some strictures resist all dilating means, and even caustics. Civiale testifies strongly to the fact that, dilate as we will, some constrictions *will* return; nor is it to be denied that the urethra occasionally becomes obliterated; for, besides the testimony of Chopart and Cruveilhier (one case each), Mr. Thompson (*op. cit.*, p. 248) points to several specimens in the British museums. In such confessedly

rare instances, the sound or director is to be passed down to the stricture, the latter divided, and a catheter introduced. This operation has been successfully done by Mr. Syme and others.

It is not our province to enumerate the various points of discussion amongst surgeons, relative to this operation. A few words will serve to show the actual state of opinion, which has been, and still is, very much divided.

Methods.—There are no methods prominently commanding attention.¹ That known by the general term, “perineal section,” is where incision is made upon a grooved staff carried down to the stricture, and the knife (a straight bistoury) being passed in, just above the anus, to the depth of an inch, the left finger being in the rectum, the end of the sound is felt for, and the canal divided upon it, cutting through the strictured portion into the clear passage beyond. After this, a gum-elastic catheter is passed and retained.² Thus the passage is maintained free, and the wound heals over the catheter.

This operation is founded upon the proposition that: “*When a sound of any size can be passed through a stricture into the bladder, division of the stricture, from the surface of the perinæum, is certainly contra-indicated.*”³

Mr. Syme, in 1844, from entire failure by all methods of dilatation, accompanied even by internal incisions, devised and executed an operation, which has since borne his name, and given rise to no little comment. This operation he has frequently practised, and its success has been most flattering, with two or three exceptions. Some cases of relapse have occurred, which were duly acknowledged by Mr. Syme. The axiom above stated is wholly reversed by him, and in the class of cases which stimulated him to the operation, he has revolutionized surgical procedures. Over seventy successful operations in his hands, and several by other surgeons, place this mode of external incision very favourably before the profession.

Mr. Syme starts with the proposition that no stricture is “impermeable” through which any urine passes.⁴ Into and through any

¹ Except, perhaps, Mr. Syme's.

² To be changed in three or four days. (Druitt.)

³ Thompson, p. 246.

⁴ *Impassable Stricture.*—Lately, in Nélaton's wards, at l'Hôpital des Cliniques, M. Phillips, by M. Nélaton's invitation, put Mr. Syme's principle (that *some* instrument can always be passed through a urethra from which urine filters away)

such constriction, some sort of instrument will go, if managed by a careful and patient manipulator. The instrument introduced may be very small, but it will serve as a guide to the bistoury; and, in these obstinate cases, when it is proved that no other method will succeed, Mr. Syme's is certainly admirably suited. Indeed, it is a

Fig. 59.



External incision in stricture of the urethra. Position of the hands when about to cut upon the staff. (Syme's method. Copied from Thompson's Work.)

question whether many cases, where dilatation has finally succeeded, would not have been better treated by his plan.¹

to the test. The patient, a man 42 years old, had several strictures, and urinated by drops only. After two hours' trial, a filiform bougie of whalebone was passed into the bladder. This kind of bougie has the advantage of retaining its form unchanged by the heat of the urethra, "and its point may be directed towards the circumference of the canal, where, nearly always, the opening of strictures is found." Dilatation by successive bougies, gradually enlarging their size, and, finally, urethrotomy internally, became possible; and a sound was introduced. The patient went out of the hospital, wearing with ease a sound of eight millimètres.

M. Phillips prefers, for urethrotomy, the instrument devised by M. Charrière the younger, because it cuts better from before backwards, than does the urethrotome with an olive-shaped blade. (*Gazette des Hôpitaux*, July 14th, 1857.)

¹ It should be stated that Mr. S. does not advocate his procedure in cases of retained urine, with largely distended bladder, and which require immediate relief.

The following is a condensed account of the operation: First, it is essential that an instrument penetrate into the bladder through the stricture; and the chief reasons are, the risk and uncertainties attendant on cutting without any guide to the knife.

This condition existing, and the case being such as to justify the method, on the above grounds, the patient is placed in the lithotomy-posture, the limbs supported by two assistants; a curved and grooved director, such as will pass the stricture, is introduced into the bladder. Resting on the knee, or sitting so low as to be about opposite the perinæum, the surgeon incises the latter, down to the urethra, over the site of the stricture. An inch and a half is Mr. Syme's rule for the length of the external cut. Holding the staff in his left hand, and assuring himself of the groove of the director by the right forefinger, resting upon, and guarding the "straight bistoury," he cuts into the groove,¹ through the urethra, behind the stricture, and, running the knife forwards, divides the diseased portion of the canal. The director being then withdrawn, a No. 7 or 8 catheter is introduced and retained; the patient being immediately put to bed, to remain for forty-eight hours. The catheter is then to be "withdrawn, and all restraint removed." (*Op. cit.*) In this, as in all operations for stricture, even where the passage seems wholly free, the occasional use of the bougie is demanded.

Usual Results.—Thus far, the results have been favourable—successful, in fact—in a large proportion of the cases operated upon; the operation may fail; in a larger number of cases than those of complete failure, there may be relapse. Mr. Syme believes the latter is owing either to incomplete division of the strictured part of the urethra, at first, which is essential to success; or, to too rapid union of the edges of the wound being permitted, the sound not being perseveringly passed, after the operation;² or, in the third place, to persistence in debauched and intemperate habits.

¹ "On the bladder side." Syme, *Stricture of the Urethra*, 1849. See also a capital description in Thompson, pp. 270, 272.

² The success of the operation, it would seem, rests very much upon this after-treatment. As Mr. Thompson shows, the new tissue, thrown out between the lips of the wound made in the old, is of course far more distensible, granulations being permitted to spring up, and then unite. Dilatation may then be as easily effected as upon stricture which is of recent origin.

About 120 cases are on record, the greater proportion being set down as "successful."

In the *Medico-Chirurgical Transactions* (second series, vol. xxii., London, Longman & Co.) Mr. Syme has published an account of a new method for opening im-

Dangers.—Hæmorrhage may be feared, but has been inconsiderable, or not mentioned in the cases reported; never, we believe, announced as fatal; scarcely ever even dangerous, although one or two instances of rather alarming nature are related. Division of the bulb of the urethra, always liable to occasion bleeding, will, of course, give rise to a certain amount of it during this operation; and it nearly always must be opened. If the incision be carefully made in the median line, we avoid, so far as we can, the two arterial branches belonging to the bulb. (Thompson.) Supposing a free hæmorrhage to occur, it can usually be arrested. Pressure by a T bandage was applied successfully by Dr. Dunsmore, of Edinburgh, when "considerable" bleeding had occurred. Mr. Thompson mentions cold applications, and if these be not sufficient, pressure by a dossil of lint between the lips of the wound, and a pad over it. The catheter in the urethra, of course, enables us to maintain the pressure. The verdict as to hæmorrhage is, that it is never "necessarily" dangerous.

Phlebitis and pyohæmia sometimes follow; they are, however, infrequent, and doubtless hospital influence, in three or four of the cases mentioned, was not trifling, in addition to the operation. Out of 113 cases, only four deaths are recorded—surely a very small fatality.¹

Urinary infiltration has been supposed possible, but experienced surgeons have not met with it. If the deep perinæal fascia be thoroughly divided, the accident might be feared; scarcely otherwise. It is not classed amongst the consequences of the operation.

III. CERTAIN REMOTE CONSEQUENCES OF ORGANIC STRICTURE.

Urinary abscess exhibits itself in an acute or inflammatory, and in an indolent ("cold"), chronic form. It is generally seated in

permeable urethra. It was tried in two cases. The *Lancet* (February 27th, 1858) has the following account of the procedure: "The plan proposed is, first, to pass a staff, grooved on its concave side, through the false passage into the bladder; secondly, to pass down the urethra to the point of occlusion, the guide director employed for dividing strictures by external incision, and, forcing it through the obstructing texture into the groove of the staff, proceed onward to the bladder; and, thirdly, to place a knife in the groove and cut outwards, through the thicker substance, in the exact line of the urethra."

¹ Thompson.

the perinæum; gives rise to much the same symptoms as purulent collections in other parts do, and requires, especially in the acute form, very prompt and decided measures.

Mode of Formation.—The pathology of the affection is clear. If urine pass from a small ulcerated opening and infiltrate the sub-mucous tissues never so slowly, pus will finally be generated as an effect of the irritation, inflammation, etc. Lymph is deposited around the collection, and the tissues give way before it by absorption. If left to itself, it makes way through the integuments, discharging its contents, and laying the foundation of urinary fistula; a large portion of the urine may flow from such an opening.

But there may be abscess *in perinæo* without original communication with the urethra; it may subsequently open into the canal, especially if not interfered with by the surgeon. A very gyratory course is sometimes pursued by fistulæ thus developed; and the most extreme deformity of the adjacent parts may ensue. Lymph and other inflammatory products, with burrowing of matter, and extension of sinuses, accompanied by thickening and induration of the tissues, multiple abscess in the neighbouring organs, and calculous deposit near the origin of the fistulæ, in the cavities of evacuated abscesses or of the prostate, are common results.

Treatment of Urinary Abscess and Fistula.—When the tender, painful, but generally not very prominent, swelling of urinary abscess is detected, and especially if there be a deep, throbbing tension of the whole perinæum—indicating matter pent beneath the deep fascia—and œdematous scrotum, with heat of the parts, and alternate shivering and flushing, there should be no delay in opening the perinæal region, in the mesial line, and directly anterior to the anus. The depth to which the incision is to be carried is such as will penetrate the fascia, which usually confines the matter. An inch to an inch and a half is the distance advised.¹

Even if no matter be reached, we are called upon to make an incision, since some relief will be afforded by the bleeding and the freeing of the tension.

As *urinary fistulæ* generally follow chronic urinary abscess, or such cases of the acute form, as, having opened of themselves, subside into the same condition—the urine flowing by the abnormal passage—the first object the surgeon has in view in the chronic

¹ Thompson.

abscess (often insidious and very slow in its development) is to evacuate the matter by a free incision. Next, if fistula has formed, and the stricture has been neglected, immediate steps are to be taken to fully open the urethral canal.

These means, in a majority of instances, suffice to heal the fistula also. When, as often happens, the internal track of the fistula has become lined by a species of mucous membrane, it becomes necessary to employ other means in addition to the dilatation. Thus, the nitrate of silver, either solid or in solution, the actual cautery, and that by galvanic current,¹ are recommended, in order to excite adhesive inflammation. Previous to, and pending these processes, every means of equalizing and quieting the pelvic circulation² and of calming the patient generally, should be employed. The horizontal posture must be maintained, and all sources of irritation to the parts, especially of an erotic nature, avoided.

The occasional opportunity for curing fistulæ, when external incisions are made for the relief of stricture, has already been mentioned. Fistulæ have been closed by transplantation of a flap of adjacent tissue, but the operation is exposed to many sources of failure. The edges of the aperture are pared, as in other plastic operations, and, a catheter having been passed, the portion decided upon is confined by delicate sutures. Great care is requisite to insure an undisturbed process of union.³

¹ Thompson.

² Ibid.

³ *Urethroplasty by a New Method*. By Dr. Reybard, of Lyons.—“The author (*Gaz. Méd. de Lyon*) relates a case of hypospadias in a youth of 14, for which he operated with entire success, by the following method:—

“A medium-sized gum-elastic catheter being introduced into the bladder, the skin of the penis was drawn downwards upon it, so as to cover the abnormal fissure. The integument was fixed in this position by the quilled suture. The free edge of each of the folds of skin thus approximated was now pared by a stroke of the scissors. The raw surfaces were brought into exact apposition by stitches, the quilled sutures being undisturbed. An incision was made through the skin the greater part of the length of the dorsum penis, to take the strain off the sutures.

“The novelty in this method of autoplasty consists in the simultaneous employment of two sets of sutures, protecting the wound from the filtration of urine, an obstacle which Ségalas and Ricord have obviated by making artificial perineal fistulæ. Dr. Reybard considers his operation well adapted to the cure of ordinary fistulæ, with extensive loss of substance.” (*Virginia Medical Journal*, Dec., 1857.)

The above allusion to the two forms of suture and the design of their use, if a “novelty” in urethroplasty, finds its analogue in the method adopted some time since by Mr. I. Baker Brown, of London, for remedying perineal rupture in child-birth. The two sorts of suture are there employed with somewhat similar intent. A recent case enables us to verify the excellence of the plan.

Fistulæ which do not manifest themselves externally,¹ must be opened and made into those of the usual sort, when the treatment is the same.

Urethro-rectal and *urethro-vesical* fistulæ occasionally follow stricture. Both are best treated by the actual cautery, but are often difficult to close. Previous to operating, let the bowels be well evacuated, as constipation must be maintained for at least three days subsequently. A speculum being introduced into the rectum, and "a full-sized sound" into the bladder, the cautery is effected through a *fenestra* in the former. Two or three repetitions are demanded every week or ten days. Quietude, as far as possible, must be maintained.

False Passages.—Whether produced by the misuse of a sound or catheter; by choosing one too small; or by caustic bougies recklessly or clumsily handled; the treatment is the same. Enter and dilate the true passage with a metallic sound, or else retain a small catheter in the canal. Mr. Druitt says: "When a surgeon suspects that he has pushed an instrument out of the right passage, he ought to leave the urethra untouched for at least a week."

SPASMODIC STRICTURE.—The existence of this form has been denied² by many, but it is now generally recognized.³ It is observed in certain cases of organic stricture; after long, voluntary retention of urine,⁴ and inordinate venery; in urethræ partially recovered from inflammation, and often under the influence of excess of wine during that state; as a consequence of violent exercise; of horseback riding; it is sometimes conjoined with calculi and irritating affections of the rectum; with parasites or hæmorrhoids within the latter;⁵ with irritable ulcer or fissure of the anus,⁶ tape-worm, ascarides, etc.

¹ "Blind urinary fistulæ."

² See Appendix, Note Z.

³ Ollivier does not practically recognize spasmodic stricture. That sounding and other operations may sometimes excite spasmodic contraction, he allows—but does not consider this as sufficient to found a separate form. Laugier, Sanson, and Boyer admit the existence of the condition.

⁴ The writer has observed one marked instance from this cause, and others, where the venereal act, often repeated, has seemed causative. Thompson attributes the retention from the first of these cases, to atony of the bladder arising from distension, and to the spasmodic action of the compressores urethræ.

⁵ And after their ligation; an instance of retention of urine from sympathetic constriction, following this operation, and requiring the use of the catheter for several days, occurred long since. It is familiar to most surgeons.

⁶ Thomp

Prurigo of the genitals, so often noticed in old persons, is also accused of inducing urethral spasm and constriction.¹

No slight agency is attributed to disorder of the digestive organs; to the rheumatic and gouty diatheses, and to irritable, melancholy, and other morbid mental states. It is asserted, on the authority of Sir B. Brodie, that an intermittent character, amenable to quinine, occasionally attaches to spasmodic stricture.

Locality of Spasm.—Its usual site is near the portion surrounded by the *acceleratores urinæ* and Wilson's muscles; it may be two, three, or four inches from the *meatus*.² It is believed that both the involuntary and voluntary muscular fibres occasionally take part in the spasmodic constriction, and the fact that the former run the entire length of the canal, whilst the latter embrace the membranous portion alone, well accounts for the diversity of action.³

Nature.—Essentially transitory, but still of frequent recurrence. Permanent stricture is known not to exist, by reason of the occasional entire freedom of the canal. Pure spasmodic stricture is doubtless exceedingly rare.

Treatment.—Whilst local applications may occasionally be of some advantage, the most rational treatment is that directed against the *causes*, not the *symptom*. That is, we remedy organic stricture, guard against the other enumerated exciting influences, and act upon the constitutional predisposing tendencies.⁴

INFLAMMATORY STRICTURE.—Many regard this form as nearly identical with spasmodic stricture, possibly from the fact that the two are very commonly associated. Spasm, moreover, is one of the results of inflammation.

Whenever urethritis exists, more or less obstruction of the canal must ensue—often it does not amount to absolute stricture. The stream may be narrowed, but not twisted or forked—and consequently the patient is less concerned than if he observes those changes of form. Cases of this description, however, occur where the difficulty progresses farther; and greater obstruction, together with the

¹ Thompson.

² Phillips.

³ Thompson. (*Op. cit.*, p. 140.)

⁴ Mr. Thompson says: "Local treatment of the urethra itself is of secondary importance—often unnecessary, sometimes, indeed, prejudicial." By this he probably means that local *internal* treatment is prejudicial. Possibly, also, while outward antispasmodic and soothing applications are sometimes useful, they may occasionally not only fail, but by an unexpected action, *excite* the parts.

elements of permanent stricture, arises. Inflammatory narrowing and stricture of the urethra recognize gonorrhœal attacks as their most frequent cause. Too sudden checking of the accompanying discharge, and the rough or injudicious use of instruments, often excite or aggravate the obstructive tendency. Another cause is excess in wine, and too much bodily exertion during gonorrhœa. That mental action, especially when provocative of erotic desire, contributes to fix the condition more firmly upon the patient, is undoubted. As a consequence of these agencies, there is an exudation of albuminous or even fibrinous nature, thrown out more or less extensively around the urethra, with turgescence, and a certain amount of constriction.

The form of urethral narrowing, known as "varicose," and previously alluded to, although it is a mooted question how far such a distinction is useful or proved, has some ground for being recognized. Facts tending to confirm its occasional presence are cited.¹ Mr. Thompson (*op. cit.*) thinks that many cases referred by observers (amongst others, Leroy d'Etiolles) to this cause are ascribable to "spasm of the involuntary muscular fibres." The assertions of those who announce the lesion, do not seem to rest upon *post-mortem* evidence. For practical purposes, the surgeon hardly need regard the division.

Treatment of Inflammatory Stricture.—It has always been advised to meet the prominent symptom of inflammatory stricture—*retention of urine*—by depletory and general relaxing measures, before attempting to use the catheter—warm baths,² cupping, induction of perspiration, and even of faintness, have been the usual means. We believe that nauseants, could they be made to act promptly and continuously, would be very serviceable. Opium, by the mouth and the rectum, is often efficient—and the liquor opii sedativus, in the dose of 20 to 25 minims, with 30 or 40 minims by enema, has been found an excellent mode of administration. Purgation is, also, a powerful adjuvant.

Of late, the very gentle, yet steady and persevering use of the catheter, *at first*, and before instituting any constitutional treatment,

¹ Morgagni, Garangeot, Genland, J. L. Petit, and Lafaye—cited by Semmering—assert the existence of such a condition. Hunter, Chopart and Desault deny. Leroy d'Etiolles maintains its reality. Civiale is an unbeliever.

² The whole body to be immersed, and the temperature of the bath should be 102° to 104° Fahrenheit.

has been strongly recommended.¹ An instrument of medium size is preferable to a small one; if it be caught and held by the turgid urethra, a pause is made; by degrees the constriction may yield, and then, gentle, but firm, pressure may be resumed. This course is to be pursued through all the points of obstruction, until the bladder is reached. Frequently the condition may be conquered in this way, without the annoyance and disadvantages of the general means mentioned. Should this plan fail, the bath should then be resorted to. Sometimes the patient will pass his water while immersed—a most happy result. If still unrelieved, the opiate treatment mentioned should be adopted—the patient being put to bed and warmly covered, so as to favour perspiration. Opium tends to allay the involuntary, powerful efforts at miction, which aggravate the existing difficulty. A further step, if required, is to bleed locally. Cupping is esteemed preferable to leeching. From six to twelve ounces may be taken. If the urine flow, even in a small stream, there is some relief, but a powerful cathartic will be very likely to make it pass freely. A drop of croton oil, or a colocynth enema is recommended.

If full relief be not thus obtained, the catheter, again tried, may pass more easily; and if still foiled, the surgeon should make another attempt whilst the patient is in a hot bath.

Purgation is well borne by some persons, and answers the end proposed, but there are others who suffer from any prolonged action of the sort. Certain enfeebled constitutions will not bear it at all. Opium is considered of far greater value in the majority of these cases.

There has been reliable testimony lately offered as to the remedial value of anæsthetics in retention from inflammatory stricture. We believe that in both the spasmodic and inflammatory form, they should be tried. Mr. R. M. Mackenzie (*Monthly Journal of Medical Science*, March, 1852) reports the entire success of chloroform in obstinate retention; the urine being expelled with force as soon as the patient was fully under its influence.²

The tincture of the muriate of iron, once highly lauded in retention, seems now to be rather distrusted. It was deemed almost a specific in the dose of from fifteen to twenty minims every ten or fifteen minutes during an hour.³

¹ Thompson.

² Referred to by Thompson. (*Op. cit.*, p. 290.)

³ Ibid.

If retention be rebellious under all the means enumerated, the surgeon is reduced either to forcing the stricture by the sound, cutting into the urethra,¹ or puncturing the bladder above the pubes; or, as has been very successfully done of late, by Mr. Cock, of London, tapping it by the rectum.² The present opinion is highly favourable to the procedure.³

Ollivier, whilst testifying to the occasional success of the conical sound in these cases, if managed by skilful and patient hands, opportunely warns us that false passages are easily made; and as he pertinently remarks, "if such accidents have befallen Desault and Roux, how much more are they to be feared in less skilful hands!" (*Dict. de Méd.—Urèthre.*) He avows his preference, in such obstinate cases, for puncture of the bladder; to be, of course, followed by measures for re-establishing the freedom of the urethra.

The following method of treating urethral stricture is quoted by the *New Jersey Medical and Surgical Reporter* (January, 1858), from a Russian Medical Journal:—

"Dr. Thielman (*Med. Gaz. of Russia*, 1857) has, for thirteen years, treated strictures of the urethra solely with iodide of potassium. Twenty-seven cases, in the St. Peter and Paul's Hospital, at Petersburg, of different degrees of intensity, were cured solely by this means. The cases were generally of long standing, and in the majority of instances, accompanied by gleet. A solution of two drachms of the iodide to six fluidounces of water was given—a teaspoonful three times a day. When the specific effect of iodine set in, smaller doses were given, till the patient could bear the full dose. The first effect of the remedy is an increased gleety discharge, and subsequently a 'melting down' of the cicatrized tissue constituting the stricture. The stream of urine soon becomes larger, and finally assumes its normal size. The duration of treatment was from two to eight weeks. In cases where the stricture could be felt externally, iodine ointment (℞j to ℞j) was applied. The gonorrhœal discharge, in many cases, ceased spontaneously, while in the rest it was removed by the usual means." (*Medic. Newigk.*)

Such a power of this remedy over stricture will be good news

¹ See Appendix, Note AA.

² First done by Mr. Fleurant, of the Charity Hospital, at Lyons, in 1750. (*Sédillot, Med. Opérat.*, p. 939.)

³ See Mr. Cock's paper, read before the Medical and Chirurgical Society, April 13th, 1852; also Mr. Thompson's remarks. (*Op. cit.*, pp. 303, 4, 5, 6.)

both to patients and surgeons. The statement seems extraordinary; like one of those things "too good to be true!" The medicine should be promptly and widely tested.

IV. LESIONS OF THE VERU MONTANUM.

Hypertrophy, induration, inflammation of its enveloping membrane, flattening, scirrhus hardening, and entire disappearance of this body have been noticed.¹

Difficult of diagnosis, the etiology of these affections is obscure. They have been referred to the imprudent use of astringent injections in gonorrhœa; to the action of bougies and sounds; and to congested states of the prostate gland. Vesical calculus has also been thought influential, and Civiale mentions calculus in the prostatic portion of the urethra as undoubtedly so. He regards Sir Everard Home's ascription of certain of the lesions of the veru montanum to prolonged walking, to equitation, or to excessive venery, with frequent and long-continued erections, as not only problematic and coincidental, but savouring of the "marvellous," etiologically.

Whilst the mere fatigue of a long walk is certainly not likely, even if often repeated, to occasion such serious difficulty, we see no reason why the other influences mentioned by the English surgeon may not be effective, or, at least, predisposing, causes.

Treatment.—Remedial measures are usually of no avail, because patients rarely confine themselves to one surgeon.

If the urethra be very irritable, means should be taken to soothe it. If the bougie be passed, an imprint of a certain amount of deformity is likely to be seen upon it, which is of value diagnostically.²

Often, no precise diagnosis being possible, treatment is wholly at fault—at all events, it is greatly restricted in its scope.

Besides endeavouring to diminish the urethral sensitiveness, inflammatory indications are to be antiphlogistically treated. Cauterization has been advised, when ulceration, atrophy, or similar lesion is discovered. Also, if a tumour, referrible to hypertrophy

¹ Civiale.

² Mal. des Organes Genito-Urinaires; tome ii. pp. 237–8–9–40. (Civiale.)

of the veru montanum, be ascertained, the ligature, or destruction of it by other means—much as is done in cases of tumour at the vesical neck—may properly be attempted.

V. DILATATIONS OF THE URETHRA.

As an effect of stricture, and seated, of course, behind it, dilatation of the urethra occasionally exists. Usually not very appreciable, externally, it is sometimes quite perceptible. It has been demonstrated that all the urethral tunics participate, at times, in this enlargement;¹ and it is supposed that injury, or actual perforation of the internal coat by sounds, bougies, or spontaneous ulceration, may allow distension of the external covering *only*.² Auguste Bérard refers to a congenital narrowing of the *meatus urinarius*, and a peculiar, inherent weakness of the urethral walls, as causative. M. Hendriksz³ (cited by Bérard) reported a remarkable instance of urethral dilatation, due to a valvular fold near the meatus, whose concavity looked towards the bladder. Similar conditions have already been referred to in these pages. In the above case, the resulting tumour could not be evacuated except by making pressure with both hands.

These dilatations are usually seated in the perinæal region; they are sometimes just in front of the scrotum. In one of Chopart's cases, and in that related by Hendriksz, the swelling extended from the anterior implantation of the scrotum to the base of the glans penis.

Dilatations, with or without excessive tumour, may continue for many years without giving trouble. If they burst, which is very possible, infiltration of urine, with abscess, is the result.

Those swellings which have been attributed to irritation and consequent induration over a limited space, may arise from a slight extravasation of urine through a small solution of continuity, produced as above intimated. Or, as has been suggested, they may spring from a hypertrophied and dilated follicle, as in urethræ chronically diseased. Their cure is to be attempted on resolute principles, by emollient applications, friction with mercurial ointment, etc.

¹ Chopart—by necroscopic inspection.

² Boyer.

³ Archives de Médecine; 4me serie, tome ii. p. 99.

In both classes of dilatation, if stricture or a congenitally narrowed meatus be etiological elements, measures suited to secure the freedom of the canal must be at once undertaken.

Catheterism, in the first form of this affection, with the design of allowing rest to the urethral walls, should be practised for several days, and four or five times a day (Bérard); or else a catheter must be retained. The first method is considered the best. Hendriksz excised a portion of the tumour in his case, and approximated the parts by sutures.

VI. AFFECTIONS OF THE FEMALE URETHRA.

I. POLYPOUS OR VASCULO-CELLULAR PROMINENCES AT OR NEAR THE MEATUS URINARIUS.

Small tumours, usually pediculated, sometimes very sensitive, and exceedingly prone to bleed, and which occasion pruritus, smarting, pain, and heat of the part, are quite common. They may even be large enough to embarrass the flow of urine. Excision with curved scissors, drawing out the excrescence with forceps, is the simple method, which usually succeeds. The nitrate of silver may be subsequently applied.¹

Dr. Walter Channing, of Boston, has lately published some interesting cases, with practical remarks, illustrative of this class of urethral maladies. He very properly calls attention to the fact that irritable bladder frequently (perhaps always) accompanies growths of this nature. He says: "The suffering is great; but worse, the bladder becomes seriously impaired in its functions, and may always trouble the patient. In this form of the disease, the diagnosis is made with much difficulty, so that the effect of a disease becomes the leading object of regard, while the disease itself lies unnoticed and unknown. Symptoms of grave renal trouble may be developed at length, and a condition of hopeless invalidism may be the result."²

Not only the morbid growths, with "a patulous" and unhealthy,

¹ Caustic potash, nitric acid, etc., have been used in these cases; but if excision be thoroughly done, the lunar caustic is sufficient. If the potash be used, diluted vinegar is to be applied subsequently, and if it be necessary to insert the caustic deeply, a tube, with a *fenestra* in it, must be employed.

² On some of the Diseases of the Female Urethra. (*Boston Medical and Surgical Journal*, March 6th, 1856.)

red meatus, accompanied by distressing dysuria and depression of spirits, are observed—but, without the excrescences, a cracked or fissured state of the urethra, of rare occurrence, painful during micturition only, or chiefly—the meatus being patulous but healthy—is also occasionally seen.¹

Excision and the nitrate of silver were generally successful in Dr. Channing's cases of outgrowths. In one instance, where sensibility of the morbid production was so excessive as to necessitate *anæsthesia*, neither ether nor chloroform could overcome the condition, but the application of ice enabled the operator to remove the diseased portion; no uneasiness being manifested by the patient, either on handling it, holding it with forceps, excising it with scissors, or cauterizing, with the nitrate of silver, “the cut base which was deep within the meatus.”

This paper having been read before the “Suffolk District Medical Society,” certain of the members reported cases. One related three, another two. “In one of the last, no structural disease had been discovered, though carefully looked for. The pain was confined to the urethra, and was represented as very severe. Many methods of treatment had been used. Some months of relief were experienced, but certain threatenings of return of the symptoms had been recently manifested.” Other very interesting cases were related where no urethral lesion was discovered, though most carefully sought for, and where the symptoms described in the cases in this paper were present in severe form. In these, injections of narcotics and sedatives into the urethra had proved remedial.

Sometimes these growths are exceedingly delicate, filiform, and hardly to be perceived by the eye; yet they even then cause a great amount of suffering, disproportioned, entirely, to their size.

II. PROLAPSUS OF THE URETHRAL MUCOUS MEMBRANE.

This is a rare affection, but well-authenticated cases are reported. Sernin and Tavignot are cited by Ollivier to this effect. The condition is not unlike that of prolapse of the rectum. A red, bulging swelling, of the size of a pea or of a small nut, appearing in the site of the meatus, which latter is concealed, usually, by these prolapsed folds, is the condition observed. A catheter can generally be passed, with a little manipulation.

¹ Channing. (*Loc. cit.*)

Treatment.—It may possibly be reduced by means of the fingers, somewhat as in rectal taxis, employing also the catheter. *Ligature*,¹ *cauterization* with a strong solution of nitrate of silver,² and *excision* are recommended; the latter, strongly, by Ollivier.

III. STRICTURE OF THE FEMALE URETHRA.

This is confessedly quite infrequent. It may be permanent, or spasmodic; partial, or occupying the entire track "from end to end."³

Spasmodic stricture, although doubtless very rare in women, is possible. In deciding upon any particular case, both diagnostically and as respects treatment, the influence of hysterical agency, and that of unhealthy states of the urine, should be remembered. The presence of foreign bodies in the bladder or of morbid urethral growths would contribute to the condition.

Before considering organic stricture, we advert to certain peculiarities in the anatomical structure of the female urethra, previously only cursorily mentioned.

Differently circumstanced from that of the male, the female urethra has no duct-openings, as it takes no part in the generative function. There are, however, mucous crypts, chiefly upon its lower surface; and quite a depression exists just within the meatus. The canal is about one inch and a half in length, very slightly curved, with its concavity looking upwards; and, passing from the *cervix vesicæ* through the two layers of deep perinæal fascia, it opens near the summit of the genital fissure. Its mucous lining is loose⁴ and rugous, and the whole passage is exceedingly dilatable—a very important quality in circumstances already alluded to.

The mucous coat shows stratified epithelium, which becomes spheroidal as the bladder is approached; and, next to the mucous membrane, elastic and unstriped muscular fibres are found, which connect with the longitudinal ones of the bladder.⁵

A small collection of venous radicles, looking like erectile tissue, is seen, and a conglomeration of cellular and elastic textures lies just in the rear of the deep perinæal fascia and "surrounding the

¹ Séguin, Bibliothèque Médicale, tome lxxviii. p. 86.

² Colombat, *Maladies des Femmes*, tome i. p. 373. Ollivier. (*Loc. cit.*)

³ Blundell, cited by Thompson. (*Op. cit.*)

⁴ And effaceable by dilatation, except on its floor, where a resemblance to the prominence of the *veru montanum* is remarked as permanent. (Thompson.)

⁵ Külliker. Thompson.

short division of the canal." (*Auct. cit.*) This has been referred to as analogous to the prostate gland in man.

Compressores urethrae muscles are predicated for the female urethra, in that there is "a disposition of voluntary muscular fibres, precisely similar to that seen in the male," in the locality there accorded to them.

Usual Site of Stricture.—At or near the external *meatus urina-rius*. The exceptional cases, where the narrowing pervades the entire canal, are very rare.

Causes.—Contusions during labour, or from external violence—the latter are uncommon, because the canal is so well guarded—inflammation, especially the gonorrhoeal, propagated from the vagina to the urethra; chancrous ulceration, occasionally (Thompson); retention, with incontinence, of urine, resulting from partial destruction and subsequent narrowing of the meatus and anterior part of the urethra from previous chancres. (*Gaz. des Hôpitaux*, April 4th, 1856.)

Treatment.—Dilatation usually succeeds. In certain cases, slight division of the constricted portion is justifiable, and even necessary. "A membranous fence," one line and a half in thickness and two lines from the meatus, was divided by Mr. Earle,¹ and subsequent dilatation with bougies completed the cure. There had been so much distress during micturition, that vesical calculus was suspected.

There may be both *contraction* and *dilatation*, in different instances, occurring congenitally, in both sexes; and either partial or general. Rokitansky mentions, in addition to the above fact, the narrowing of the female urethra, produced by prolapsus of the vagina or dislocation of the uterus. The measures remedial of those accidents are indicated. When closure occurs from inspissated mucus, "croupy exudation," impacted calculi, or other offending foreign bodies, acephalocysts, etc., much of the management is that for true stricture, in itself so much less frequent. Antiphlogistic means will reduce inflammation; the sound will remove mucus, and dilatation or forceps rid the passage of intruders—certain of which, if not large enough to occlude it, will very likely cause spasmodic, if not originate organic stricture. Removal is generally too prompt to allow such results.

¹ Medical Gazette, vol. iii. p. 470-1.

To present a condensed view of the most important practical points suggested by the subject, has been the aim of the writer. The accumulation of new facts, new aspects of disorder, new remedial measures, tempts one to continual additions to such a *résumé* as has been given.

There is scarcely a fresh treatise upon these topics but offers many interesting and essential views and hints; while medical periodicals, with almost every issue, inundate our field of observation with novel cases, extended necroscopic examinations, plans of treatment, modified or original—and ingenious theories—which latter, if they subserve no other purpose, accustom the thoughtful mind to scrutinize closely and discriminate accurately.

In the midst of so much floating material, there come to us treasures of information worth every effort to secure. The practitioner, as he surveys this constant stream, derived from such various sources, and seeks to appropriate whatever is truly valuable, has firm ground upon which to stand, in the imperishable productions of those brilliant and laborious investigators who have so satisfactorily explored the wide domain of these complex affections *consilio et manu*.

1. [REDACTED]

2. [REDACTED]

3.

A P P E N D I X.

A.

OBSERVATIONS UPON DIABETES.

THE pathology of this affection being in an undetermined state, we are induced to refer to certain recent opinions upon its nature, and which confirm us in the decision announced at the commencement of this volume, viz., the exclusion of diabetes from consideration *as a disease of the urinary organs*.

Dr. Hodgkin made (in substance) the following, among other, remarks, before the *Harveian Society*, session of 1852-3: "Although I do not doubt that, in many cases of diabetes, a very careful microscopic inquiry might detect some changes in the delicate and beautiful structure of the Malpighian corpuscles, so admirably described by Mr. Bowman, I must admit that my own experience accords with the statement which I heard many years since, by the late Dr. Babington, 'that there is no perceptible morbid change characteristic of diabetes, since we may sometimes find the kidneys exhibiting no marked deviation from the healthy state, either as to size, colour, or texture; whilst sometimes they may be considered soft and flabby, and, in other instances, preternaturally firm.'" Dr. Hodgkin goes on to say that he had always been struck with the fact "that the alvine secretions were as much deranged as that of the kidneys." Nearly all authorities remark that dyspeptic symptoms are the first indications to which attention is particularly drawn. Several have referred to the good effects of high physical training, etc.; Dr. Hodgkin also believes that "a trainer (*i. e.*, a gymnast) would, perhaps, be the best hygeist" for a diabetic patient. He refers to Bernard's curious experiment to show that irritation of a particular portion of the brain produces sugar in the liver; and, concluding that such influence is doubtless transmitted by the *par vagum*, the inference seems to be that production of sugar, and its consequent elimination, in diabetes, may depend upon a similar cause. The "irritation" in the brain, we suppose, may be either mechanical or

mental; possibly anxiety, vexation, overwork, etc., might induce this state of things. As yet, all seems, in great part at least, conjectural. Dr. H. attaches primary importance to the "digestive organs, and more especially to the stomach, liver, pancreas, and to some undetermined condition of the nervous system, by which these organs are influenced," yet he "does not limit the interest to them alone. The kidneys also claim attention; and great importance should doubtless be attached to the peculiar cachectic condition superinduced, very probably, 'through the kidneys, by the disease.'" With deference to so high authority, it may be hinted that the "cachectic condition" is likely enough to be induced by many other concomitant causes; quite as much so as to be solely derived from or "through the kidneys." General perversion and deterioration of various functions and organs may contribute to such a result. Dr. H. adds, that the cachectic condition "seems to result from the combined action of the diffusion of the sugared blood over the system, and the imperfect elimination of those excrementitious matters which the kidneys are destined to throw off. Dr. Bence Jones lately called attention to the long-known opinion that the tendency to diabetes is sometimes a feature of senile decay. He says: "The disease (diabetes), I consider, arises from the arrest" of the change of the starch (during digestion) into the two last forms it healthily assumes. Instead of going regularly through, thus—dextrin, sugar, vegetable acid, carbonic acid—it stops at the *sugar*. He, however, refers to certain facts which seem to indicate another cause also acting in the disease. (Vide *Lectures on Animal Chemistry*, English edit., p. 117, and foot-note.)

Many now believe diabetes to be under the governance of the nervous system. (*Gibb; Goolden et alii.*) Dr. David Nelson, of Edinburgh, considers that congestion of the kidneys is nearly constant in true diabetes; but remarks that the actual nature of the disease "is as great a mystery as ever," and coincides with Dr. Graves in thinking "all the views are contradictory and unsatisfactory." Both gentlemen think the kidneys may play some part in the creation of sugar, by perversion of function. Dr. Nelson would deem the French experiments, by which it is attempted to class diabetes with cerebral diseases, doubtful. Certain secret changes in the ganglionic innervation and extreme capillaries, he believes, may be active in the causation. If concomitant of digestive disorder, merely, it would be more common, and more pathological changes would be found. (*Lancet.*)

Dr. Richard H. Goolden (*Lancet*, August, 1854) remarks the infrequency of true (saccharine) diabetes. Rarely, on an average, does a practitioner meet with more than two or three cases in a year. Even in London hospitals, the disease is not common. Dr. G. states that in cerebral and nervous diseases, the absence of sugar in the urine is the exception and not the rule. In a case of concussion of the brain, from

a blow, the patient had copious diuresis, and sugar was detected in the urine. Two other similar cases were traceable to injury of the brain; another to impending paralysis, which was finally declared: under treatment for cerebral congestion, the diabetic symptoms suddenly disappeared, and the paralysis was partially relieved.

The same physician (*Lancet*, September, 1854) says: "Saccharine urine, without diuresis, is a very common affection, and is so constantly associated with cerebral disease, that few cases of chorea and epilepsy occur in young people without betraying a trace of sugar in the urine. In neuralgia, saccharine urine is sometimes passed; when the nervous affection goes off, the sugar disappears."

We should not, therefore, always pronounce the existence of *diabetes mellitus* from finding the urine somewhat saccharine. "The idea of diabetes being a cerebral disease is so recent, that pathological anatomy supplies us with no records." The above cases and remarks seem favourable to the cerebral hypothesis. Whether referrible to disordered digestion, or to irritation of the brain, or to both combined, we believe that enough proof has been adduced that diabetes is not properly to be reckoned among diseases of the urinary organs, in the present state of our knowledge. Mere "congestion" of the kidneys, their "flabbiness," or "preternatural" firmness, does not prove them the source of the disorder. Moreover, the proportion of cases is quite large, in which such changes are not observed.¹

In connection with a report of a case of glucosuria, reported by Dr. Minot to the Boston Society for Medical Improvement, Dr. Ellis referred to certain marked changes noticed microscopically in one of the kidneys of the patient. He stated that "the tubuli of the cones and cortical substance were darker coloured than usual, and crowded with minute fat globules, granular matter, and probably diseased cells or nuclei. * * * Not a healthy tube or cell was anywhere seen." Similar results were noticed, says Dr. E., in a like case in 1853. Still another instance is referred to, where, "although the cortical substance presented nothing remarkable to the naked eye, the tubuli had lost the greater part of their epithelium." Dr. Shaw verified this, and "also found the tubes crowded with granular matter." Wedl has noticed one case (*Path. Histology*, Syd. Soc. ed., p. 263) where fat-globules filled the tubuli, and the free epithelium cells showed the same change.

Dr. Ellis said he thought these cases interesting, as showing the fallacy of the general belief that the kidneys are not diseased in diabetes. Diseased appearances have been recognized in the kidneys of diabetic patients, though but infrequently; and usually these appearances have been those

¹ Probable atonic condition of the system.

clearly referrible to over-use. Dr. Prout's observations have previously been referred to in this connection. (See *Preface*.) It is not unreasonable, moreover, to suppose that the passage of so much abnormal material (sugar) through the organs, contributes to the injuries sometimes observed. As yet, however, even these appearances are the exception. Dr. Ellis very truly remarks that "the number of observations is small." With him, we think that "a more extended examination of the subject" is likely to show a frequent participation of the kidneys, "seemingly healthy," in the disorder—the cause of the participation being, in the main, that which we have stated. Dr. Ellis says, in conclusion, "by this it is not intended to assume that the difficulty may be traced to the lesion of these organs. The evidence to the contrary is abundant and conclusive. The facts, however, are very important, and will become more so if corroborated by others." (*Boston Medical and Surgical Journal*, March 4th, 1858.)

True diabetes is easily recognized. Sugar, often in abundance, always in marked degree when the disease is established, is the great characteristic. Profuse flow of urine, accompanied by more or less dyspeptic disorder, gradually increasing, with emaciation; and, finally, if not relieved, frequent accession of phthisical disease, is a condensed description of its course and tendency.

In an instance lately reported (*American Journal of the Medical Sciences*, January, 1855), the sugar was so abundant as to become crystallized upon the *labia* of a female patient, causing intolerable itching and discomfort. This was one of the chief things which led her to call in medical aid. Specific gravity of the urine 1.032; 4 quarts in 24 hours. (Cure, on a meat, bread, milk, and *porter* diet—iodide of potassium, etc.)

In addition to the numerous tests which have long been in use for detecting sugar in the urine—such as that with liquor potassæ (Moore's test); with dilute sulphuric acid (Runge); solution of sulphate of copper (Trommer); hydrated oxide of copper and liquor potassæ (Cappezuoli); the crystallization test; the torula test; and the fermentation test, by adding yeast, etc., which was first proposed by Christison—the following, entitled "new test for diabetic sugar," is furnished by Mr. John Horsley, in the *Association Medical Journal* for July, 1854:—

"If a freely alkaline solution of chromate of potash be mixed with urine suspected to contain sugar, and boiled, the liquor will assume a deep sap-green colour, arising from the decomposition of the chromic acid, the reduced chromium being held in solution by the potash. It is very delicate; five or six drops, only, of saccharine urine diffused through water, will show it. The author recommends a mixture of equal parts of a solution of neutral chromate of potash and liquor potassæ to be kept in the chemical cabinet of every medical practitioner, labelled, "*test for sugar*."

When the quantity of sugar is very small, a piece of white paper, placed at the back of the test-tube, makes the test-action more distinct.

Dr. Garrod prefers the "fermentation test." Dr. Goolden,¹ Trommer's test, and liquor potassæ.

An important point to be noticed in suspected diabetes, is the *specific gravity of the urine*. This may be termed the *bedside test*. Range of specific gravity of diabetic urine from 1.020 to 1.050; when above 1.035, sugar undoubtedly exists.

Case of Diabetes Mellitus; reported here for certain inherent peculiarities. —Patient, a man of 50 years; active; had lived well; not in habits of excess. Perspiration, habitually, free; he noticed this discharge to diminish, and, at last, to cease; his two great "wants" then were *drinking and urinating*; micturition as often as twenty times daily; the same desire tormented him even at night. Quantity passed daily, estimated one gallon. Rapid emaciation; urine saccharine. A chemist detected "grape-sugar." There was remittance of the malady. "It is well known that this affection may disappear and recur at longer or shorter intervals." From this it is argued that "diabetes must be classed among the affections of the nervous system." There was, in this case, disappearance of the disease under tonics and ioduret of iron. The reporter considers its going off under this treatment remarkable. Hardly so, we think, if the disease be often dependent on a worn-out, cachectic state of system, or, at least, if it occur in that condition. On relapse, the sugar again left the urine, while the patient used Vichy water. There had never been gastritis, anorexia, nor lumbar pains. Was the remittent character indeed referrible to *cerebral influences* in any degree, or alone to the remedies?

The observations comprising the above note were collected previously to the publication of M. Bernard's detailed experiments, although some of his investigations are alluded to. The note is allowed to remain, as presenting certain considerations worthy of notice. Of late, Bernard's conclusions have been thoroughly examined and criticized, and some even deny their truth altogether; at any rate, the glucogenic function of the liver is disputed.

Amongst other remarks relative to the production of the abnormal sugar, Dr. G. Owen Rees has some of no little importance, as made in his *Croonian Lectures* before the Royal College of Physicians.

Dr. R. says, very truly, that we are not "so nearly about to unravel the difficulty as we might, at first, be inclined to believe." He instances the fact that the sugar formed by injuring the base of the fourth ventricle, and that in the urine of true diabetes are not identical. He concludes,

¹ Of St. Thomas' Hospital, London.

moreover, that "we are to look for the cause of diabetes mellitus in a disturbed state of the hepatic function, not in an increase of *natural* action, but in an action varying in *kind*." * * "We know that acids are active in the vegetable kingdom—we know that the liver substance is acid—may not an over-acid state cause the production of this abnormal sugar? or may not even a too slow circulation through the organ (by allowing too long contact with acid matter) bring about disease? These are questions requiring much consideration."

Diabetes arising from concretions upon the *nervus vagus* has been noticed. Three instances have been referred to by Swedish physicians. (See *Dublin Hosp. Gaz.*, Jan. 15th, 1857. From *Transactions of the Swedish Society of Physicians* and *Amer. Journ. Med. Sciences*, October, 1857.) An interesting description of the necroscopic appearances in one case is reported, as above. Bernard's views are seemingly thus confirmed; and to the possible objection that other disordered manifestations should arise as well as diabetic symptoms, it is replied that the extreme voracity of appetite noticed in the patient examined, may be considered an effect of the same cause.

B.

MALFORMATIONS, UNUSUAL FORM, ETC., OF THE BLADDER.

These, not properly considered under the title of "diseases," are referred to, both as presenting points of interest, and as occasionally becoming causative of, or elements in, disorder of the functions, if not the origin of structural changes.

Extroversio vesicæ, a very annoying and disgusting abnormality, is well described by Rokitsansky, Coulson, and others. The viscus, thus turned inside out, presents the posterior wall, by protrusion, at the lower part of the abdomen; the ureters are consequently exposed, and are seen constantly distilling the urine, which, by its flow, renders the patient uncomfortable to himself and repulsive to others, the urinous odour being insufferable. The *penis*, generally only rudimentary, may present complete *epispadias*.

This deformity is most commonly met with in males. It is comparatively rare. The inconvenience, etc., may be greatly alleviated by the judicious application of a silver bowl or shield, with a tube to lead off the urine. Rokitsansky found the exposed vesical surface in a state of fungoid degeneration, in an old, adult specimen. Excoriation of the inverted surface, and of the neighbouring integument, is always observed in greater or less degree.

Not long since, a man gained his living by exhibiting himself,¹ and selling representations of his extroverted bladder.

¹ In Massachusetts, and possibly elsewhere.

Atresia vesicæ, or unusual contraction of the vesical neck, sometimes occurs; its effects, or similar phenomena, have been referred to.

Malformation by deviation from the usual *shape* of the bladder, is not infrequent; irregular or constant contraction may cause it; so may hypertrophy of tissue, when a cylindrical, cuneiform, or cordate form may be assumed. (Rokitansky.) Dilatation, by causing *diverticula*, deforms the viscus; the *diverticula* become important as receptacles for calculi, and their mucous membrane is liable to ulceration and perforation from inflammatory action; sinuses, traversing the vesical coats, may thus be formed. (*Auct. cit.*)

We remember being shown, at a private course of pathological anatomy by M. Pigné, then Curator of the Musée Dupuytren, Paris, a female bladder of triangular¹ form, which presented, at each of its angles, a hernia of the mucous membrane. This was shown to prove that the lesion did not result from the use of the sound,² which could not have reached each, probably not any, of these "angles." This sort of hernia, having been said to be quite frequent in the male from the use of the instrument, M. Pigné also exhibited its occurrence high in the upper wall of the organ, and where the sound never rests long at a time.

Mr. Simon lately related a case of malformation of the bladder; the ureters passing close to the rectum; no opening into the bladder—at any rate, none efficient. An attempt to make a passage for the urine into the rectum was unsuccessful. After death, the ureters were found filled with lithates and phosphates. In a less extreme case, even, the chance of the patient escaping serious urinary difficulty would be but small.

C.

In connection with the subject of confused diagnosis from anomalies, etc., a case by William Davies, M. D.³ (Bath, England), may be advantageously cited here, entitled "*Distended Kidney simulating fecal accumulation in the caput coli.*" *Symptoms, signs, etc.*—Anxiety; irritability; aphthous condition of the tongue, lips, and cheeks; the former much furred. Pulse 80; nausea and vomiting; tendency to constipation; frequent desire to urinate; nothing abnormal in the urine. A large, elastic, flattened tumour, extending from the crest of the *ilium* on the right side to the lower margin of the false ribs, and to within about two inches of the *umbilicus*, was very distinctly made out. No tenderness or

¹ Not infrequent.

² "*À demeure*," or otherwise.

³ In "*The Association Medical Journal*," April, 1854.

uneasiness on pressure over the tumour; flatus detected in the bowels, etc.; treatment accordingly, for supposed fæcal accumulation. *Necroscopy*.—Right kidney enormously distended; pressure of contained fluid the cause and prolonging influence; retention of the fluid effected by a uric acid calculus impacted firmly in the mouth of the ureter; very remarkably, the left kidney was in the same condition, only in less degree, and *from precisely the same cause*; its interior structure was much changed; it had the appearance of a multilocular cyst; both kidneys were extensively atrophied. Previously to the accession of the large tumour, a smaller one had rapidly disappeared under the use of aperients; this fact had induced the belief of similar nature for the larger swelling. The reporter concludes that, coincidently with the use of the aperients, the obstructing body shifted its place, and allowed the imprisoned fluid to escape; the tumour disappearing; subsequent re-impaction of the concretion caused renewal of the morbid state. Had the tumour of the *left* kidney been recognized during life, the diagnosis might have been modified. These cases may completely simulate intestinal obstruction; there is usually pain, and often emaciation. The patient, in the above instance, was a female, 65 years old, and everything tended to strengthen the supposition of fæcal obstruction.

A case, in which a vast sac, formed at the expense of the left kidney, *was mistaken for splenic enlargement*, is reported by M. Paul Lorrain, in a French journal. Renal calculi seem to have first induced the morbid process. The illness was long, and every curative means was tried. Competent judges supposed the tumour splenic; it was bi-lobed, and grew to be very large; there was evident fluctuation; great constitutional sympathy; anorexia, etc. An attempt was made to evacuate the fluid by using caustic potash upon the outside, etc.; adhesion of the peritoneum to the parietes of the abdomen was effected; a trocar and canula, on use, brought away four and a half pints of pus; iodine was thrown into the sac; the swelling decreasing, and rising higher in the abdomen. Thirty days after the operation, the patient was better, arose, and regained appetite; hopes of recovery were entertained; a new abscess formed, and the patient died in ten days thereafter. The urine had always been limpid. *Post-mortem examination*.—The tumour, composed of the remains of the left kidney—a sac, merely—was bound by adhesion to the abdominal walls; the passage made by the trocar communicated freely; false membrane lined the interior of the cyst.

Grayish pus and calculi in the sac; the calculi quite large; one free, of cubic form, five centimètres in diameter; another, encysted (*enchastonné*), rather larger, branching, like a piece of coral; a smaller one, contained in a pocket, which communicated with the cavity enclosing the

others, by a narrow passage. Composition, mainly ammoniaco-magnesian phosphate.

The ureter, of which only the upper half was left permeable, in the portion just below, was supposed obliterated for some time; or, at least, "*obturé, à sa portion inférieure.*" (*Gazette Médicale de Paris*, July, 1854.)

D.

Dr. Bright's divisions of the disease which, by so good a title, bears his name, were, it is well known, three; while Rayer made *six*.¹ 1st. *Congestion*,² with *hypertrophy*; 2dly. *Granular kidney*; 3dly. *Atrophied, hardened, anæmic kidney*, were Dr. Bright's clear and sufficient distinctions. Much discussion has arisen as to the intimate nature of the disease, but we believe that the best authorities at present look upon and recognize it in the manner we have adopted.

In a carefully written paper, published in the *American Journal of the Medical Sciences*, October, 1851, the late Dr. W. I. Burnett endeavoured to controvert certain points connected with the more generally received opinions. He believed the affection to be "one of a decidedly inflammatory character; it is primitively an acute or subacute nephritis." The writer seemingly forgot the almost universal restriction of the congestion, observed in the renal tissue, to its cortical portion, and also that mere *congestion* is not *inflammation*. We do not believe that any first rate authority gives us reason to advocate precisely, if at all, this view.³ The author of the paper to which we allude, subsequently referred the disease to a morbid condition of the blood, "producing a low, inflammatory tendency throughout the system," and which is "expressed" by the kidneys. It is added that Rokitsansky, Rees, and Walshe, support this theory. We find the first of these, while he considers Bright's disease "to consist in an inflammatory process which proceeds from a state of *hyperæmia* to one of *stasis*, and then gives rise to" the morbid "product," etc., pronounces it to be commonly a chronic affection, and only "sometimes acute." Diseases which debilitate, and habits of life having the same tendency, it is well known, contribute to produce and aggravate it. This is not the place for a lengthy discussion upon the nature of the affection, but as bearing upon a point of diagnosis, we refer to it. Rokitsansky says: "The granulations in Bright's disease are therefore in reality the Malpighian corpuscles charged with an albumino-fibrinous substance," albumen being predominant. Pus-corpuscles are also sometimes remarked. (Gluge.) All

¹ And Rokitsansky, eight.

² Chiefly of the capsule.

³ That is, of true, idiopathic, *acute* nephritis, as a common, or frequent, commencement.

writers admit the obscurity which veils the cause of the abnormal product. While speaking of the signification of fatty deposit in the kidney, Dr. Burnett mentions its frequent occurrence in the kidneys of persons exposed to the influence of poor diet and privation; and refers to its innocuousness when not in sufficient quantity to really obstruct and injure the renal tissue. Doubtless—but if the researches of Johnson and many others be true, the above circumstance, in no slight degree, upholds them; in just such patients does this degeneration very frequently occur. Moreover, the numerous instances in which observers of the most undoubted accuracy have demonstrated the existence of fat in the renal tissue, when treated by heat and ether, quite overbalance the six cases adduced by Dr. B., certain of which are far from being demonstrated as Bright's disease. Even had he collected many more, as he intimates was possible, while we respect his great research and unusual acquisition, we should not, on such evidence as his paper, alluded to, affords, consider his point satisfactorily made out. In alluding to the term "desquamative nephritis," etc., Dr. B. remarks that "he considers every nephritis desquamative." Supposing this invariably true, in what does it invalidate the beautifully minute and accurate investigations by which the different forms of nephritis are recognized?

E.

Renal calculi may simulate stone in the bladder. A case, illustrative of this, and also of the fact that very young infants may have concretions in the kidney, is furnished by Mr. E. Cousins, in the *Association Medical Journal* (November, 1854). A male child, 8½ months old, brought up on artificial food in the East Indies; always well from birth until ten days previous to the first visit made to it by the reporter (August 15th, 1854), and which had never had diarrhœa or any disorder of the bowels, nor taken any medicine from birth to the date of this illness, died soon after being seen. It had had a remarkable *tenesmus* whenever it went to stool or attempted to urinate, from the age of three or four weeks until the date aforementioned; latterly, there had been *prolapsus ani*. Irritation of some sort, probably vesical, was suspected. At the *post-mortem* examination, the rectum was found prolapsed and extensively ulcerated. The prepuce was long, and abraded at its extremity (doubtless from being pulled by the patient; here, a sign of vesical calculus¹ would be derived). The bladder was empty; its walls were very muscular and thick. In the right kidney was an enormous quantity of sabulous matter; in the left, still more; the renal texture was firm, the capsule adherent; at one extremity,

¹ Although none really existed.

an incision laid open a small cavity containing pus; and two or three calculi were found in its vicinity, in the renal pelvis, and which were composed of urate of ammonia.

F.

Vide *Specimen No. 601*, "Cabinet Boston Society Medical Improvement." "Ureter dilated to within two and a half inches of the bladder, and then abruptly contracted from the size of the thumb to about the usual size. Pelvis of the kidney dilated; the organ itself atrophied." *Symptom mentioned*: Merely frequency of micturition. Death by *apoplexy*. Had the renal disorder anything to do with its production?

G.

Cystitis propagated from urethral inflammation is often very violent. A case is reported by M. Dufour (*Gazette Médicale de Paris*, July, 1854) of such an occurrence in a man 23 years of age, who, in a foolhardy attempt to overcome chordee, during an attack of gonorrhœa, and by *coition*, sustained rupture of the penis. There was hæmorrhage and finally gangrene, with communication of the inflammation to the bladder.

Symptoms, etc.—Swelling and subcutaneous ecchymosis of the penis; retention of urine; gangrene; all the symptoms of cystitis. Death in eight days.

Lesions.—Left kidney enlarged, congested, and softened; bladder distended by bloody and foetid urine, filling the entire pelvic excavation; its internal membrane was riddled with ulceration, so that it appeared lined by a false membrane of reticulated form; mucous surface of the urethra of a dark red colour; lower urethral wall perforated; between the urethral parietes and the integument of the penis, there was a gangrenous excavation.

H.

In the *London Lancet* (August, 1854) Henry Thompson, Esq., remarks that in a rheumatic or gouty affection following gonorrhœa, undue frequency of micturition may occur without inflammatory symptoms, or even those of simple vesical catarrh, the skin being dry and harsh, and the digestion impaired. The neck of the bladder may become affected, and then the urine may even be albuminous, and yet no serious renal disease exist; the state seems to be a result of irritation, secondary to, and depending upon the condition of the bladder.

In such cases, the absence of the constitutional signs of organic disease of the kidney, and the non-appearance of diseased epithelium or casts in

the urine, will lead the observer to connect the albuminous urine with some functional and not organic derangement. In certain cases, vesical irritability may be owing to an atonic or relaxed condition of the mucous membrane; much distress may arise from urgent calls to urinate; but this, on account of the nature of its cause, is not relieved by antiphlogistics, but by stimulating injections into the bladder. Hence the general ground of diagnosis.

There are cases of vesical irritability from congenital narrowing of the urethra, close to the external *meatus*; incision relieves the symptoms completely; the catheter, alone, will not do so. Again the remedial measure becomes diagnostic. Mr. Thompson refers to Civiale, who mentions neuralgia of the vesical neck, owing to narrowing at the *meatus*; entire relief is experienced on division. Prostatic irritation, and undue sensibility of the prostatic urethra especially, Thompson believes to be more frequent than altered innervation of the vesical neck (Civiale's opinion is just the reverse), and that they will quite as readily produce symptoms of irritability of the bladder.

The frequency of irritable bladder in the young is alluded to; it is usually most manifest at night, either from deficiency of retentive power or from the expulsive function being unnaturally called into action. There are many causes—dentition, intestinal worms, other foreign matters in the bowels, deficient tone of the system; *habit*, as is widely remarked, is a powerful agent.

Irritability of the bladder following gonorrhœa may long and obstinately persist; it is often a mere habit; the bladder, having become accustomed to retain only a few ounces of urine, resents the presence of a greater quantity. Resolution in resisting the too early call to urinate will conquer this. When satisfied of this state of things, we recognize functional and not organic difficulty.

I.

Vesico-intestinal fistula is one of the rarest pathological occurrences. A case is reported by Dr. Sturm as taking place in a man 40 years old, in good health, and which was probably caused by ulcerative inflammation of a *vesical varix*, which had, at first, contracted adhesions and then became the seat of perforation.

Phænomena: Hemorrhoids; irregularity of the bowels; pain in the sacral region; swelling of the anal veins; painful shootings, of very peculiar nature, returning by accessions of short continuance, and running the entire length of the penis; finally, gas escaped from the urethra during urination; fragments of almonds were next found in the urinal; these had been eaten the night previously. No fistula could be discovered

between the bladder and intestine. Dieffenbach was consulted in vain in 1845. The patient was relieved by drinking large quantities of water; his general appearance was good, as to health; the appetite was retained completely; emaciation was gradual; loss of strength the same. The pain, however, increased, and at last produced maniacal agitation. Peritonitis supervened and terminated fatally. Duration of the disease, sixteen months.

The accident already mentioned was discovered on dissection; fecal matter was found in the bladder, and dilated veins were discovered just above the *sphincter ani*.

J.

Dr. Watson, in the *Glasgow Medical Journal*, 1854, after speaking of the frequency of a partially paralyzed state of the bladder in old age, and of its dangerous tendency, says that its cause is generally obscure, but it may frequently be attributed to the unusual resistance, often made in advanced years, to calls for urination. Whatever the cause, when once the bladder has lost the power of completely evacuating its contents, the failure of contraction gradually increases, until even excessive dilatation occurs; the partial, though laboured, evacuations obtained from time to time by the patient, dangerously deceive him as to the real peril he is in, and often lead him to defer consulting a surgeon until too late; when, had he sooner sought aid, irremediable disorder of the urinary apparatus would not have happened.

Dr. Watson reports four fatal cases. One, in a man of 60 years, was referred by the patient to having retained his urine for a very long time against desire to pass it, some years previously. We have mentioned a case similar to this in a young, vigorous man. (*Vide* p. 26.) In Dr. W.'s patient the urine became ammoniacal towards the last of the disease; it also contained albumen, and was highly charged with viscid mucus. Fever set in, and death followed. Was not this actual cystitis? *Autopsy*.—Walls of the bladder thickened; mucous membrane "black;" in many spots, gone; large veins were crossed thickly over a great portion of it; prostate gland somewhat hypertrophied.

The second patient was a man of 55 years; the symptoms were the same as in the preceding case; death took place in from two to three months. A calculus was found lying crosswise in the bladder, and from one-fourth to three-quarters of an inch in diameter. *Treatment* in both these cases had been vesication over the hypogastrium and perinæum; every form of opiate; acids; pareira brava; sarsaparilla; solution of nitrate of silver, etc.

When a person, beyond the middle period of life, complains of frequent

desire to micturate, and voids but little urine, we may suspect that the bladder is incapable of emptying itself; recourse should be had at once to catheterism, rather than to lose time in trying useless remedies.

K.

CALCULI OF THE BLADDER SYMMETRICALLY ARRANGED, AND OF NEARLY EQUAL SIZE; COMPLICATED WITH ARTICULAR RHEUMATISM AND ENDOCARDITIS. ("CALCULUS DISPOSES EN ROSACE.")

This curious case is reported in the *Gazette des Hôpitaux*, Paris, July, 1854, by M. Larrey. The patient was a retired officer, 70 years old; robust; of nervo-sanguineous temperament; apoplectic figure; small stature, and rather fat. (*Beaucoup d'embonpoint*.) From the year 1822, he had had "gravel;" had often passed uric acid sediment, and also some large pieces. In 1842, there were symptoms of stone. M. Leroy d'Etiolles crushed three calculi; no more sediment was seen for eight years. In 1848, he had rheumatism in the neck, shoulders, "*kidneys*," and lower joints. In 1852, gravel was seen; no cessation of rheumatism. The use of Vichy water changed the form of the gravel, or crystals, from round and red, to triangular and white. The catheter showed "retraction" of the urethra; some fulness of the prostate was detected, but no calculus. Urethral inflammation arose after catheterism, and was difficult to cure. There were alternating pains in the urinary passages, and the right forearm and hand. Valvular stricture of the urethra existed about the middle of its membranous portion; spasm of the vesical neck occurred; more marked hypertrophy of the prostate was next observed, and finally calculi were found agglomerated at the *fundus* of the bladder. Slight hæmaturia and cystitis supervened; the stricture was dilated; the meatus was also too narrow. The patient being chilled, the rheumatism returned; and, after a time, endo-pericarditic symptoms appeared, and death ensued.

On *post-mortem* examination, the bladder was found lessened in volume and capacity; its walls thickened; narrow anfractuosités were observed, formed by hypertrophy of the muscular fibres ("*par relief de la membrane musculieuse*"). At the *fundus* of the bladder, a secondary pouch was found, in which five calculi were lodged, each a regular tetrahedron; the volume, weight, and colour of each being precisely alike. (The *quasi* sacculated position of the stones was doubtless the cause of their non-recognition at the first sounding.) Composition of the calculi presumed the same in each; one, analyzed, showed a nucleus of uric acid, and stratified layers of urate, phosphate, and carbonate of lime, with ammoniaco-magnesian phosphate. The position of the calculi was very

curious ; they lay in juxtaposition, their summits turned to one centre, and their bases forming the circumference ; thus constituting a regular *rosette*.

L.

"The infrequency of vesical calculus in females," says Mr. Henry Thompson, in the *Lancet*, December, 1854, "is a matter of notoriety to the profession." When observed in them, it is rarer in the period of childhood than in adult years. In males, the converse is true. In girls we have but few cases; and still fewer reports of operations for extraction. The different character of the female urethra may account, in part, for the rapid ejection of sabulous matter from the bladder.

Mr. T. relates a case: The patient, a child of nine years, was healthy and lively. During convalescence from a febrile attack (having been confined for a week), urinary irregularity was first noticed. Pain was felt in the side ; urination was frequent and difficult ; the bladder irritable ; frequent fits of retention of urine ; catheterism was practised four times in seven days. On sounding, Mr. T. found the bladder large and rugous from muscular development. There was an audible click received from the stone, which was movable, and lay deeply behind and below the internal *meatus*. The clitoris was enlarged, red, slightly excoriated, as were also the surrounding parts. The hands had been kept constantly about the genitals. Urine pale, and slightly alkaline ; crystals of triple phosphate and a few pus-corpuscles were found in it ; no appreciable amount of albumen. There was a sudden fit of retention, caused by occlusion of the internal *meatus* by the stone, the latter having become fixed, and as if grasped by the *cervix vesicæ*. Efforts to extract it were unavailing. Mr. T. dilated the urethra by means of a sponge tent ; fastening a bit of cork to its external end, to prevent it from slipping into the bladder. Lithotripsy was then performed. The patient was well in four days. The stone, estimated to be about five-eighths of an inch in diameter, was composed of uric acid and urate of ammonia. *Nucleus*: Uric acid ; slight incrustation of the phosphates.

M.

In the *Association Medical Journal*¹ the following case is related: A boy, jumping over a fence, and alighting upon a heap of straw in a rick-yard, had a firm piece of hazel wood, an inch and a quarter long, perforate the rectum and bladder, and lodge in the latter ; the wounded parts healing and closing. The urine passed always by the urethra.

¹ October 6th, 1854.

Symptoms; Pain and scalding during urination; muco-purulent secretion in the urine, and a little blood. Calculus formed and was extracted.

Calculus in an unusual Situation.—John Ward, Esq., reports the case of a seaman, sixty-four years old, who, three years previously to this narration, had lithotomy performed and a calculus taken from the bladder. Six months subsequently, he had occasional pains in the scrotum, recurring with varying frequency, at first not severe, so that he endured them for two years. On examination, Mr. W. found, at the seat of pain, a roundish body, looking like a third testicle, and of stony hardness; the pain and inconvenience were very great. An incision was made over the tumour, and a calculus extracted, ovoidal in shape (it was accidentally broken into three pieces); length, one inch and a half; width, one inch. No distinctive character; supposed to have been formed in the urinary bladder. Nothing could be elicited from the patient, either to fix the date or explain the mode of its transit to the scrotum. The wound healed well. No return of calculous disease. (*Association Medical Journal.*)

Urinary Calculus developed upon a Leaf as its Nucleus; its Spontaneous Discharge through a Vesico-vaginal Opening.—This remarkable case is reported in the *Virginia Medical and Surgical Journal* (November, 1854), by Joseph W. Smith, M. D., of Petersburg, Va. “A nucleated calculus, of immense size, passed, by ulceration, through the walls of the vagina, from the bladder, and was expelled *per vaginam*, producing vesico-vaginal fistula. Patient a negro woman, of 45 years. First symptoms occurred about twelve years ago, and were retention of urine, pain, and other indications of vesical disease. Much emaciation; general health impaired; no discovery of the offending cause. Two years since, there was incontinence of urine; pain in the neck of the bladder followed; pus and sanious matter were discharged from the vagina. Quantity of urine variable. A few days after these appearances, while at stool, a very large calculus was passed from the vagina, of ovoidal shape, three inches by two in diameter, and weighing 700 grs. (*apothecaries' weight*). The nucleus was proved to be the leaf of a plant, by microscopical examination made by Professor Leidy. It was supposed to have been introduced for the purpose of titillating the parts. The reporter remarks the great recuperative and conservative powers of nature in this instance, resisting, as they did, for years, the extensive irritation and inflammation which constantly affected so sensitive and sympathetic a part of the body.

The expulsion of the calculus was one of the feats which nature performs, when science fails to fulfil her duty.

Unusually Large Calculus.—An instance of “unusually large urinary

calculus" is given in the *Lancet* of November 7th, 1857. The specimen was exhibited by Mr. Henry Thompson to the Pathological Society of London, November 3d, 1857; and the account is so well worthy of re-presentation that we quote it in this connection:—

"This [calculus] was, strictly speaking, composed of two distinct calculi; but, having lain so long in contact, they fitted so exactly that when placed together they presented the appearance of only one. The patient in whom they had formed was a man of about forty-six years of age, who had died last June. When about fifteen years old, he had had fever; and since that time had suffered constantly from urinary symptoms, but such had been his nervousness that he had not allowed any surgeon to sound his bladder till he came under the care of Mr. Thompson, about nine months before his death. At that period he was sounded, and the stone being found of such large size as to fill the bladder completely, the idea of extraction was not entertained. He was, at that time, passing small calculous matter by the urethra, formed apparently in the prostatic portion. The treatment had been merely palliative. The calculus was removed after death; and, as was expected, it was found to occupy the entire bladder. It weighed twelve ounces; and measured ten inches and a half in its greatest longitudinal diameter, and nine inches and a half in its transverse. The nucleus was composed of uric acid; but the external layers contained urate of ammonia and phosphatic laminæ; the parietes of the bladder were not hypertrophied, a condition which had been prevented probably by the necessarily small amount of contraction of which it could have been capable during the latter period of the patient's life."

Another instance, of much interest, in which a portion of a plant was the nucleus of a calculus, is given at page 269 of this volume.

[We are favoured, some months after our brief allusion to the following case, with a detailed history of it, from the pen of a physician conversant with its entire course. It being too late to insert it in the body of the work, we gladly append it here.—See pp. 32, 33, Part I.]

"Idiopathic Nephritis, followed, ten years subsequently, by oxalate of lime calculus, apparently the result of drinking water impregnated with lime, in the limestone districts of the Western States.

"In 1842, the patient had a severe chill, consequent upon exposure, and which was succeeded by hæmaturia and acute nephritis, endangering his life. From this attack he completely recovered. In the summer of 1845, he made a voyage to Europe, and, on arriving in Liverpool, had slight hæmaturia, accompanied by feverish symptoms, and which continued for about four days; during which time, however, he went about, seeing the objects of interest in the cities of Liverpool and Manchester.

"In February, March, and April, of 1854, he took an extensive tour through our Western and Southern States, drinking freely of the water, which at the time produced no ill effects whatever. His stay was especially prolonged in the States of Kentucky, Tennessee, Missouri, Ohio, Indiana, Illinois, etc.; the district which statistics have shown to be more prolific in cases of urinary calculi than any other part of the civilized world.

"In July, 1854, without any premonitory symptom, the patient observed that he was passing blood with his urine. This continued for two or three weeks. The physician first consulted pronounced the bleeding to be either the result of simple exudation from debility, or of the action of a calculus within the kidney. A preparation of iron was advised. On the thirty-first of July, whilst dressing in the morning, there was a sudden and overwhelming attack of pain in the right side; so instantaneous and violent as to resemble a quick blow with a knife held by some unseen hand. By the time that assistance was procured, the patient was fainting. The paroxysm lasted about an hour. His physician was immediately summoned, and morphia was prescribed. There was excessive nausea, followed by violent vomiting. Partial relief was then obtained. These paroxysms continued, with a few hours' intermission, for about two weeks. The agony was somewhat relieved by narcotics. The region of the right kidney was excessively painful, on the slightest touch, during the entire period. The paroxysm of pain appeared to be accompanied by a distension of the kidney, and relief seemed to be obtained by the relaxation produced by morphia. Ether was inhaled without decided effect. The above-mentioned action of morphia appeared, at last, to permit the escape of the urine into the bladder.

"Towards the latter part of the time above stated, the pain gradually lessened, and the patient rode out on the twelfth of August; but the motion of the carriage was excessively painful to him. The pain, at this time, was not confined to the kidney, but was, in addition, felt more anteriorly.

"On the seventeenth of August, the patient went to Brookline (some four or five miles), in an *exceedingly easy* vehicle, purchased on account of that quality. In the country, with the aid of very nourishing diet and stimulants, his strength was so far regained that, on the thirtieth of August, he returned to Boston, intending to resume business. In September, however, a new symptom made its appearance. This consisted in a sudden attack of severe, lancinating, or sharp pain in the region of the *sphincter vesicæ* and prostate gland. This pain continued, with scarcely any intermission, and at times aggravated to an unbearable degree, for two weeks. It was somewhat relieved by opiate enemata. In the words of the patient himself, each time that the sphincter of the bladder contracted, 'the pain could only be compared to that which might be experienced if a ball, with

sharp steel points or knife-blades projecting from its surface in every direction, had been placed in the passage, and the parts were closing upon it.'

"This state of things continued until the third of October. Various consultations were held upon the case, and several theories propounded, until finally, at the patient's own suggestion, a sound was introduced. The sound passed without difficulty until it reached the entrance of the bladder, when an obstacle was encountered. Great credit is due to the surgeon, the late Dr. Samuel Parkman, who, without using the least force, withdrew the instrument. If an attempt to overcome the obstacle had been made, the result would inevitably have been very different, and probably disastrous. The next day, a *calculus* was thrown from the bladder without difficulty, and without severe pain.

"The calculus was composed of oxalate of lime, with a little phosphate of lime and organic matter. Its surface was nearly covered by whitish crystals, which were imperfect octohedra of oxalate of lime. There was no nucleus distinguishable from the rest of the mass. The length of the concretion was four-tenths of an inch; its breadth one-quarter of an inch; its weight over two and a half grains.

"This calculus had been forced into the neck of the bladder, where it had been retained by means of the sharp points of the crystals which projected from its surface for the space of two weeks, when the use of the sound had somewhat disentangled it, and perhaps to some extent dilated the urethra. If less caution had been exercised in the use of the instrument, and the surgeon had persevered in obtaining its entrance into the bladder, he would unquestionably have pushed the stone back into that viscus, where it would have served as the nucleus for the formation of a large calculus, which could only have been removed by a formidable operation."

The case which we have thus given in full, is replete with interest and instruction, both as regards diagnosis and the remedial attempts instituted, and is well worthy of being placed upon record. In this connection, also, the rarity of *idiopathic* nephritis may be called to mind.

TESTING THE URINE.

The ordinary tests and modes of examination of the urine are so well known and abundantly supplied to all practitioners by the admirable handbooks upon microscopy and urinary chemistry, that it has not been considered advisable to enlarge the bulk of the volume by inserting detailed descriptions of these different means, when mentioning their use (as has been done continually) for the purposes of diagnosis. No better guide to many of these processes can be followed, than the *Lectures on Animal Chemistry*, by Dr. Bence Jones. A little book, entitled *Guide to*

the Urino-Chemical Chest, by Robert Venables, A. M., M. B., is as full of information "as a nut is of meat," in its sixty-six small pages.

Scattered through larger treatises, a vast amount of information lies all ready for the use of those who have no time for minute studies themselves; and we now have ready access to many whose skill in these examinations is every day improved by practising the manipulations required.

We subjoin a list of the usual means now necessary for a common urinary analysis. They are given in the order of use.

In a note at page 25th, a few points of Heller's method of urinoscopy are given.

To collect the Urine for Examination.—A transparent vessel; say a six ounce phial. Better, a set of conical glasses (the shape is suited to hold the sediment well. *Hooper, Johnson, et alii.*) Wineglasses, running sharply to a point at their stems, answer the purpose.

To draw off Sedimentary Deposits from the narrow part of the cones, a "pipette" whose use is immediately acquired, and indispensable.

First test used, *litmus paper*; points to determine, the *acidity* and its *amount*. The paper does not determine the latter point, *i. e.*, whether the urine be *too acid*, or not enough so. After it announces that the urine is acid, either strongly or feebly, by its greater or less change of colour (pink or red), the urine, if allowed to stand for from "twenty-four to ninety-six" hours (Bence Jones) will, if too strongly acid, deposit uric acid crystals (red) visible to the naked eye; ratification, by the microscope. *Turmeric* paper is changed from yellow to brown when the urine is alkaline.

To discover the Presence of Albumen.—Heat (spirit-lamp and small test-tubes), *Nitric Acid*.—Muriatic and acetic acids, liquor ammoniæ and liquor potassæ are frequently employed. The muriatic acid precipitates uric acid and the colouring matter of the bile; it dissolves oxalate of lime, cystine and the phosphates. Acetic acid renders mucous urine cloudy, and dissolves alkaline phosphates. Ammonia throws down the earthy phosphates in the form of a white precipitate. Liquor potassæ dissolves uric acid and the urates of soda and ammonia; it changes saccharine urine to a dark colour, and thickens purulent deposits. (*Hooper and Guy.*)

To detect Excess of Urea.—Evaporate urine in a water-bath to the consistence of syrup; add alcohol; filter; evaporate the solution nearly to dryness; add a few drops of water and nitric acid. *Results*: crystals of nitrate of urea. *More simple for practical purposes*: Evaporate a few drops of urine on a fragment of glass, and add an equal quantity of nitric acid.

"Urea crystallizes in four-sided prisms, which appear to be composed of a number of acicular crystals, placed in apposition. Hollow spaces are usually present in the interior of the crystals, in considerable number.

These contain a fluid differing considerably in refractive power from the crystal itself. When the crystals are dried, these spaces are occupied with air."

"It is very curious that urea exerts a great influence upon the crystallization of chloride of sodium and muriate of ammonia. The former, which ordinarily crystallizes in cubes, in the presence of urea, assumes the form of octohedra; and the latter, whose ordinary form is an octohedron, that of a cube."

"The *best test for urea* consists in adding nitric acid to a highly concentrated solution of the fluid suspected to contain it, when crystals of the nitrate are formed."

"Not infrequently, especially in cases of acute disease, in this country [England] the urine contains so much urea when passed, that it crystallizes upon the addition of nitric acid, without previous evaporation. It appears from the observation of foreign authorities that such examples are rarely if ever met with on the continent." (Dr. Beale, *Urinary Deposits, etc., Urea.*)

To test the Density of the Urine.—The specific gravity is determined by the *urinometer*. (Prout's is the best, and, in its case, holds a spirit-lamp, test-tubes, bottles for nitric acid and aqua ammoniæ, and a thermometer.) A bottle and balance are also employed for the same purpose. (*A "thousand grain" bottle.*)

The *average* specific gravity is 10.20 (Dr. Routh, cited by Dr. Hassall). Dr. Routh found that the mean density of urine passed in twenty-four hours was, in men, 10.189, in women, 10.151; mean density for both, 10.21. As a rule, morning urine is less dense than that passed after digestion in the afternoon. (*London Lancet*, January 2d, 1858.)

The Microscope.—Pus, mucus, blood, fibrinous casts, urate of ammonia, uric acid, oxalate of lime, phosphate of ammonia and magnesia, etc. etc., may or may not be seen. (Jones.)

If *pus* be present, "the action of liquor potassæ on the sediment should produce ropiness." (*Auctor. cit.*) The eye often detects blood and pus, easily, without assistance.

N.

An enlarged prostate may thus be mistaken for stricture. This is well known, but was lately¹ well illustrated in a London hospital. There was retention of urine in "an old man, not apparently the subject of stricture," and who also had "urinary abscess." The resident surgeon had tried every variety of bougie, especially the smallest, and those of "knitting-needle" size.

¹ London Lancet, February, 1855.

kidney. When known to exist, costiveness, and the straining at stool consequent thereon, should be avoided. Peritonitic symptoms have apparently been excited by the dragging of the dislocated organ. The difficult diagnosis, and the occasional failure, even after reiterated and careful examination, to accurately trace the symptoms to their source, have often occasioned great depression and discouragement, needlessly, to patients.

It is believed that the condition is much more frequent than has been supposed. Within the last year, through the politeness of Professor Storer, we have had an opportunity of examining a female patient at the Massachusetts General Hospital, who presented a movable tumour on the *right* side of the abdomen, and which, so far as it is possible to determine without a *post-mortem* examination, was a movable kidney—the “*rein mobile*” of Rayer. Without concurring in the sentiment of the late Mr. Guthrie, who wished there might be another battle, in order to determine a surgical point, we feel convinced that necroscopy would, in this instance, and in analogous cases, prove the fact thus presumed. Dr. H. I. Bowditch has lately (January, 1858) observed another instance closely resembling the above, at the hospital.

Much useless, and even injurious treatment (so termed) has been lavished upon persons presenting this accident. A supporting and retaining bandage has sometimes been found useful; although, as we have elsewhere stated, Prof. Oppolzer, of Vienna, denies the efficacy of any appliances of this description. He believes the *horizontal posture* should be the chief reliance for quieting pain in these cases. Such confinement, if necessarily long continued or frequent, is much to be deprecated; other means ought certainly to be thoroughly tried.

Uterine complications and concomitant hepatic disorder require their appropriate remedies. If there are peritonitic or enteritic symptoms, or very severe lumbar pains, leeches or cupping, with topical emollients and narcotics, chloroform locally, and the warm bath, are indicated. Such patients should avoid fatigue, violent exercise, and sudden or undue muscular efforts.

P.

EXTIRPATION OF THE SUPRA-RENAL CAPSULES IN RATS OF THE ALBINO VARIETY (*MUS RATUS*).

The following statements were made to the Academy of Sciences of Paris, by Dr. Philipeaux, Nov. 10, 1856.

“Lately, MM. Brown-Séquard, Gratiolet, and Vulpian, have presented many interesting papers to the Academy upon the physiology of the supra-renal capsules. Since this, I have made many experiments with the

intention of ascertaining whether the capsules are essential to life." The reporter states further, that he experimented upon rabbits, Guinea-pigs, dogs, and albino rats.¹ His conclusions are : 1. That it does not necessarily cause the death of the animals. 2. That when death does occur, it is by the operation, which is grave, and either causes inflammation of the tissues surrounding the kidneys, peritonitis, or hepatitis, and that intestinal hernia is often produced, through the divided muscles. 3. That certain animals from whom the supra-renal capsules have been taken, survive, and no lasting, or even temporary, trouble is noticed in their functions. 4. That the capsules do not appear to be any more essential to life than the spleen or thyroid gland. (*Loc. cit.*) [M. Philipeaux, it will be observed, differs very essentially from M. Brown-Séquard in regard to the influence of extirpation of the supra-renal bodies upon life. The operation is certainly a serious one—but we have witnessed others fully as much so, upon animals, with conservation of life. With respect to the degree in which organs are essential to existence, the question is not very difficult ; *e. g.*, the internal are more so than the external, and certain of the former palpably more so than others. For our own part, we should suppose the spleen and thyroid gland far more important than the supra-renal capsules, if *volume* be any criterion.]

The following remarkable report is taken from the *Lancet* of November 28th, 1857, and was made to the Pathological Society of London, Nov. 17, 1857.

"Dr. Harley showed a living and apparently healthy white rat, from which he had extirpated the supra-renal capsules. He stated that he had removed these organs from this animal when it was only a month old, and not much bigger than a good-sized mouse. It is now upwards of four months old, and, notwithstanding the absence of the supra-renal bodies, it has grown up, and is a good specimen of the adult animal. It neither presents any signs of debility nor emaciation. All its functions are apparently well performed ; the hair and skin, too, present no signs of brouzing. What was more surprising, Dr. Harley stated that from this animal he had not only removed the supra-renal capsules, but the spleen also. Dr. Harley afterwards made the *post-mortem* of another rat, from which he had removed the left supra-renal capsule and spleen, six weeks ago, and the right capsule within fourteen days."

In the opinion of M. Gratiolet,² it is only the extirpation of the *right* supra-renal capsule which is fatal. This seems an unwarrantable refinement, and tends to induce the belief that the sequence was owing, in his experiments, to concomitant lesions, and especially to inflammation, for-

¹ M. Augustus Waller first experimented upon these animals.

² In September, 1856.

tuitously more severe when the right capsule was removed. At all events, it does not appear why death should more readily occur from the loss of one than of the other. We can far more easily subscribe to M. Séquard's decision, that taking away *both*, kills—and can believe that the extirpation of *one*, may—but it will require a very large number of experiments to justify M. Gratiolet's conclusion.

M. Brown-Séquard presented the results of elaborate experiments to the French Academy,¹ to the effect that the loss of the capsules *alone* is the cause of death, and not the peritonitis, and other accidents sometimes accompanying their ablation. Nine hours and twenty minutes being the average time in which rabbits, thus treated, die, peritonitis could not be very far advanced. In *induced*² peritonitis, M. Séquard found the animals lived from twenty-four hours to three days; and the peritonitis was very extended and intense. M. Séquard also says that neither the attendant hæmorrhage, nor nephritis, nor hepatitis, nor phlebitis, nor these combined, had so rapidly fatal a result as the simple ablation of the supra-renal capsules.

Bronzed Skin, etc.—A case of “*bronzed skin*” was observed by M. Malherbe, of Nantes, in February, 1856, in a female 48 years old. He had not, at the time the patient was first seen, heard of Addison's cases, but had met with M. Lasègue's version of them in the *Archives Gén. de Médecine*, March, 1856 (translated in the *Boston Med. and Surg. Journal*, September 18th, 25th, and October 2d, by R. M. Hodges, M. D., of Boston), whilst attending her. She had the marked *debility* characteristic of the affection; was anæmic, and the nervous system disordered; had vague pains, no great emaciation, and *bronzed* or *fuliginous skin*. *Post-mortem*:—Both capsules tuberculously diseased; the left chiefly so. (*Gazette des Hôpitaux*, September 11th, 1856.)

Dr. Isaac E. Taylor, physician to the Bellevue Hospital, New York, has published an account of six cases, which he terms “*Sunburnt Appearance of the Skin*.” In two of these, *post-mortem* examination revealed renal capsular disease; in one, tuberculous disease, in the other, atrophy, with a “*breaking down*” of the tissue of the supra-renal body. The other cases justified Dr. Taylor, as he believes, in concluding the same organs to be affected. The lighter colour of the skin, he thinks was owing to the affection being observed earlier in its course than the bronze colouration of Dr. Addison's patients would seem to indicate; *i. e.*, that *time* is the active element in deepening the shade—which is very logical, if M. Séquard's theory be adopted, *viz.*, that the capsules are *pigment destroyers*; for, the longer

¹ *Gazette des Hôpitaux*, 16th Sept. 1856.

² By the operator.

and the more extensively they are diseased, the greater the disorder in the distribution of pigment will be.

Dr. Taylor has given three well-coloured representations of his patients, which greatly enhance the value of his paper. The latter may be found in *The New York Journal of Medicine* for September, 1856.

Bronzed Skin ; Capsules Intact.—In the *Gazette des Hôpitaux* for April 21st, 1857, there is a report by Dr. Puech of a case of bronzed skin, the supra-renal capsules being wholly without change. The patient was a male, 54 years old, a labourer ; he had had syphilitic disease, was finally attacked with dysentery, and died of peritonitis, arising after perforation of the intestine. The colouration of the skin was of the hue of *sepia* ; and this covered the chest, abdomen, and the anterior and internal aspect of the thighs. No mention is made of the *mottled or patched* appearance referred to by Addison and others. In making a final *résumé* of cases, some future observer will find it an equally difficult and important task to analyze the various instances *reported as true bronzing of the skin*, and to determine which shall, and which shall not, receive the title.

Recent Cases and Remarks.—An interesting case of disease of the supra-renal capsules is reported by Mr. G. S. Wilks in the *Lancet* of November 21st, 1857. The account was communicated to the Royal Medical and Chirurgical Society by Dr. Addison, November 10th, 1857, and is as follows :—

“The patient first came under the care of Dr. Wilks in 1854, in her sixteenth year, suffering from chronic rheumatism. She was of a fair complexion, fat, round figure, and a particularly happy, joyous girl. In the following year she suffered from general debility, for which quinine and iron were prescribed. In the summer of 1856 she made a tour in Wales, and then, for the first time, her complexion became striking ; but she had for some time been using simple washes for what was still only regarded as severe sunburn. The colour continued to increase in depth as winter advanced. She began to suffer from great lassitude ; and after a long walk in March of the present year, she was attacked by violent sickness, which lasted for three or four days. The tongue was clean ; pulse quiet, but very feeble ; skin soft, and appetite bad. Quinine and iron were again prescribed with advantage. On the 5th of May the sickness returned violently, continuing incessant for several days and nights, and lasting, with very short intervals, during seven weeks, when she died exhausted, on the 22d of June, in her 19th year. Latterly, the skin had darkened very considerably, and had acquired a bronze tint.

“*Examination twenty-four hours after death.*—Body greatly emaciated ; breasts atrophied, areolæ quite black ; face olive-brown, chin shining like bronze. About an inch of fat on the abdomen ; none anywhere

else throughout the body. The viscera generally were quite healthy. The kidneys were small and rather flabby. The supra-renal capsule on the left side was the size of a large egg, and intimately connected with both spleen and kidney; it contained a large quantity of purulent matter. That on the right side was similarly adherent, but was smaller, and the matter contained in it was less fluid, and gave to the fingers a gritty sensation, as if of calcareous substance."

In commenting upon this case, Dr. Copland referred to the exceeding importance of the subject, and considered that "it became every medical man to endeavour to connect the bronzing of the skin with disease in the supra-renal capsules." He also spoke of the results of late microscopical investigations, and of the intimate connection these bodies are proved to have with the spinal, and especially with the ganglionic nerves, "warranting the idea that they were subsidiary to the functions of the ganglionic system, agents in the assimilation of the globules of the blood, and also in reinforcing the nervous energies of the urinary and sexual organs. The disease deserved great attention, and the thanks of the profession were due to Dr. Addison for having not only pointed out the coincidence in question, but also the relation of cause and effect.

"Mr. Henry Lee mentioned the case of a gentleman who had always been very deficient in nervous energy, and whose muscles were flabby throughout life. *Post-mortem*: The supra-renal capsules were found to be enlarged, both sides being converted into a brown, friable mass, like a piece of wet gingerbread. The skin was of a dark colour, but not so much so that it would have been specially noticed, but for the peculiarity having been pointed out by Dr. Addison."

In the same number of the *Lancet* is a report, by Dr. Murchison, of cancerous disease in the right renal capsule, with no abnormal colouration of the skin except that the latter was pale and anæmic. The left capsule was of normal size, and apparently healthy. "On microscopic examination, the cortical portion was found to contain an immense quantity of free oily matter, and the cortical cells were also loaded with oil; but this circumstance Dr. Murchison did not consider to be abnormal." [Was it normal?]

Dr. Ogier Ward had seen an instance of marked bronzing of the skin, which "had been submitted to Dr. Addison, and considered to be a distinct specimen of the disease. The patient had now completely recovered, and was at present in excellent health."

In a late British journal, quoted by the *Charleston Medical Journal and Review* for January, 1858, Dr. Bell Fletcher relates the lesions observed *post-mortem* in a patient the state of whose skin had induced Dr. F. to present his case as one "in which, probably, the supra-renal capsules were affected, and in which the colouration of the skin was modified by pan-

creatic disease." There was found "unimportant degeneration of the capsules;" but "lardaceous disease" of the pancreas existed, and "which, by extension to the surrounding organs, implicated the permeability of the receptaculum chyli and thoracic duct. Secondary deposits of the same material were found in the liver, that organ being in other respects perfectly healthy. The other organs of the body appeared normal."

The "degeneration" of the capsules spoken of may have been *relatively* "unimportant;" but no degeneration of any organ is so, *absolutely*. Whilst there are many cases which perplex the decision of the question as to the relation between lesion of the supra-renal bodies and bronzing of the skin, it seems all the more important to allow a just appreciation of every injury that exists. In the above case, the desire to be perfectly candid may have unduly depreciated the degeneration, which at all events was noted. The original report by Dr. Fletcher, upon this patient, appeared in the *Association Medical Journal*, November 20th, 1856, p. 1013. It must be confessed that cases have accumulated to some extent which prove that even in *extensive* degeneration of the supra-renal bodies, the colour of the skin has been unaffected. Professor Virchow has lately pronounced Addison's theory "that bronzed skin is to be considered a specific affection, and owing to degeneration of the supra-renal capsules," both arbitrary and unphysiological. His reasons are, *First*, that not a few cases of degenerative disease in these bodies go through their entire course without any change in the colour of the skin. At his lecture, Virchow showed several preparations of tuberculous, cancerous and cystoid degeneration of the capsules, where no discolouration of the skin had taken place. *Secondly*. In four cases of Addison's own quoting, "only one capsule was diseased, while the other was healthy; if the bronzed skin is owing to *functional disturbance* of the capsules, there is no reason why the healthy organ should not act vicariously for the one diseased. *Thirdly*. Cases have been observed where there was evident bronze discolouration of the skin, but the supra-renal capsules were found entirely healthy." (*New Jersey Medical Reporter*, January, 1858.)

Whilst it is true that these exceptional cases occur, the weight of evidence, at present, seems to be upon Addison's side; although every one must admit the necessity for a vastly increased number of facts, before a final judgment can legitimately be rendered. Several questions might be raised with respect to even Virchow's positions. Thus, if vicarious action be supposed, would it follow that *no* ill effects would be perceived from the disabling of *one* of the organs? A man, we know, may live a long time with one kidney, but doubtless his lack of the other has had *some* untoward action upon the system. Again, there must be some agreement as to what is *bronzed* skin, before any single reporter's cases can be accepted. The definition by Addison, repeated by Hutchinson, and which

is well illustrated in the work of the former, at once commends itself to the eye. Those instances presenting this hue, and disclosing no lesion of the capsules, *post-mortem*, are so many counter-indications of the theory; but the test must be rigorously applied. The decision is thus wholly dependent upon time and accurate observation.

Dr. Harley's Researches.—Dr. Harley has lately been contributing to the histology of the supra-renal capsules. In a short paper published in the *Lancet*, December 19th, 1857, under the reports to the Royal Medical and Chirurgical Society, this gentleman announced certain observations of much interest.

First, he proved, by specimens shown, that the supra-renal bodies continue to develop, after birth, "at a certain ratio" of increase. *Secondly*, he stated that "as they did not become proportionally more atrophied in old age than many of the other organs, it might naturally be supposed that they had a certain function to perform in adult as well as in fœtal life. *Thirdly*, "he denied the existence of any large cavity in the centre of the healthy supra-renal capsule, and said that when such was found, it was the result either of accidental rupture of the medullary substance, or as the effect of disease. He pointed out, however, the existence of a number of small sinuses in the centre of the organ."

There are several other points worthy of notice, for which reference may be made to the paper in question. Dr. Harley is Lecturer on Practical Physiology and Histology in University College, London, and his opinions and announcements of microscopical facts are entitled to the respectful attention of those investigating this interesting subject.

In the *British and Foreign Medico-Chirurgical Review* for January, 1858, Dr. Harley has an elaborate paper in which he discusses the *histology, chemistry, effects of removal, and pathology* of the supra-renal capsules. In conjunction with M. Philipeaux, he has experimented largely upon animals, chiefly young rats, and it has been found that three months and more after the extirpation of both capsules and spleen, the creatures are "alive and well." The same experiments have been performed with a similar result upon dogs and cats.

Dr. Harley's paper is to be continued in a subsequent number of the journal referred to; his conclusions, thus far, are as follows:—

- "1. The supra-renal capsules are not solely fœtal organs.
- "2. The supra-renal capsules are not absolutely essential to life.
- "3. The removal of the right is generally more fatal than removal of the left capsule.
- "4. That convulsions do not necessarily follow the removal of the capsules.¹

¹ In a letter dated Nov. 15th, Professor Virchow informs me that he, also, has extirpated the supra-renal capsules, without having noticed the derangement of

"5. That the absence of their function (in rats) is attended neither by great emaciation nor debility.

"6. That when death follows upon the extirpation of the supra-renal bodies, it is in most cases in consequence of the injury done to the neighbouring tissues; perhaps, most frequently, the mutilation of the ganglionic system of nerves.

"7. Absence of the function of the supra-renal bodies is not proved to have any special effect in arresting the transformation of hæmatin, or in increasing the formation of blood-crystals.

"8. The suppression of the supra-renal capsular function is not attended by an increased deposit of pigment in the skin or its appendages (in rats).

"9. The problem of the connection of bronzed skin and supra-renal capsular disease is more likely to be solved in the dead-house than in the physiological laboratory." (*Loc. cit.*)

M. Brown-Séquard has lately enunciated the following propositions in reference to the functions of the supra-renal capsules. The communication was made to the Académie des Sciences at its session, December 21st, 1857; and is reported in the *Gazette Médicale de Paris* of the 2d of January, 1858. Dr. Séquard's conclusions are, 1st. "That the functions of the supra-renal capsules seem essential to life in animals not albinos. 2d. That the *immediate* and *complete* suppression of these functions induces death very rapidly. 3. That the *gradual* suppression of these functions induces death, at the latest, in a few months, and in certain kinds of animals, in a few days. 4th. That the simultaneous ablation of both supra-renal capsules causes death, generally very much sooner than the extirpation of both kidneys does. 5th. That if certain animals of the albino variety seem capable of definitively surviving the loss of the supra-renal capsules, the fact supports the opinion (announced by M. Séquard) that one of the principal causes of death in animals not albinos, after the loss of these little glands, consists in an accumulation of pigment."

Q.

In the *Boston Medical and Surgical Journal* for May 15th, 1856 (p. 295), is a report, by Dr. J. B. S. Jackson, upon a malformed fœtus, sent for exhibition to the "Boston Society for Medical Improvement," March 10th, 1856. In this specimen, *there was fusion of the kidneys and of the supra-renal capsules*. Dr. Jackson remarks that the latter organs "were not so small as they almost invariably are in the acephalous fœtus." The form of fusion of the capsules was that of the horseshoe kidney. In ad-

the central nervous system mentioned by Brown-Séquard. I should add that I have seen two animals suffer from convulsions after extirpation of the capsules. One, a cat, died soon after, having slight tetanic symptoms.

dition to the cases referred to in the Society's Catalogue, it is mentioned that another instance of fusion of the supra-renal bodies has recently been observed. Dr. J. has now seen four cases.

R.

IMPACTED CALCULUS, WITH SACCULATED KIDNEY.

A remarkable instance of this affection is reported by Dr. Peacock (*London Lancet*, June 7th, 1856). The most striking fact about it is, perhaps, that the disease was *not suspected during life*, and as it must have been of some duration, the patient was served by one kidney for an unknown period. The urine was healthy during life, and the right kidney was found large and vascular, "weighing six ounces and a half, avoirdupois." The patient, it was found on inquiry, had (although no renal disease was diagnosticated) "complained of pain in the left iliac region, extending down to the groin, and an abscess had formed in the groin, which was opened, and soon healed, five years before." The left kidney was in the following condition: "Converted into a large multilocular sac, the parietes of some of the sacculi being entirely membranous and very thin, and the renal structure being everywhere almost entirely atrophied." This distension of the pelvis and calices was caused by a calculus impacted in the pelvis, and which "must have nearly, if not quite, closed the entrance into the ureter." Of a dusky-red colour, scabrous, and evidently oxalate of lime, it consisted of "a body and three projecting extremities, which protruded into the expanded calices." A small phosphatic deposit was found at the end of one of these projections, which weighed, when dried, one drachm and three-quarters, avoirdupois. The sacculi were filled with a thin, dark-coloured fluid. "The ureter was throughout pervious."

The patient was a female, twenty years of age, and died of phthisis of more than three years' duration, pneumonia finally supervening, on a somewhat improved condition, during her stay in the "Hospital for Diseases of the Chest, Victoria Park."

S.

WOUNDS OF THE KIDNEY.

The late Mr. Guthrie, in his work on the Surgery of the Continental War, states that wounds of the kidney have been less fatal than those of the spleen, though, by reason of the complications which attend them, they are scarcely less dangerous. The successful cases on record are not numerous, and the practice to be pursued can only be general. Gunshot wounds, even when urine has been discharged at the external opening—

showing a lesion of the kidney, or of the ureter at its upper part—have promised well. Mr. Guthrie saw two cases of this sort after the battle of Waterloo; one of them he thought would recover.

Hennen has given similar testimony. One case of gunshot wound, shown to have injured the kidney, is quoted from his work¹ by Fabre, in his *résumé* of the subject. (*Bibliothèque du Médecin Praticien*, vol. ii. pp. 285–6.) Fabre also refers to an instance he personally witnessed.

Dr. S. D. Townsend, of Boston, has furnished us, by request, with the following account of an interesting case observed by himself:—

“A boarder at the Tremont House, Boston, some years since, in a fit of insanity, jumped out of the third story window of the building, on the side facing the burying-ground, and was impaled upon one of the upright portions of the iron fence surrounding the latter. The spike entered his right side, over the kidney. In a few days, the wound sloughed, and urine issued from the opening. This continued for a few days, when the wound healed, and the patient entirely recovered, but only to destroy himself afterwards with a pistol.”

T.

ENORMOUS CANCEROUS MASS IN A CHILD'S KIDNEY. (MEDULLARY FORM.)

An extraordinary instance of renal cancer is reported in the *London Lancet* for June 7th, 1856, from Dr. Hawkins;² the weight of the degenerated kidney being thirty-one pounds.

A condensed account of the chief phenomena is as follows:—

It is believed that the disease must have existed a long time, but the period, of course, could not be determined. It is remarked in this connection, that even congenital cancer of the medullary form cannot be looked upon as impossible; and that although it is “by far the most frequent malignant disease to which children are liable,” yet, as a primary renal affection, it does not appear to be common, “and rarely acquires the size of the tumour here described.” (*Loc. cit.*)

The child, a male, six years old at death, was of healthy parentage; was observed, at six weeks of age, to have the left extremities larger than the right; the abdomen was always thought to be somewhat larger than normal. The child's health, however, was always “fair” till about six weeks before entering the hospital (the Middlesex), when he was suddenly taken ill. A tumour was then detected, by the mother, in the upper left abdominal region, seemingly only about two inches in diameter. From a state of complete anorexia, when first siezed, the boy be-

¹ Principles of Military Surgery, by John Hennen.

² By Mr. Barley Balding, Surgical Registrar to the Middlesex Hospital.

came voracious. He was also emaciated, and on entrance at the hospital, the abdomen was much swollen, especially on the left side. Emaciation steadily continued, although the patient ate, drank, and slept well, and complained of little or no inconvenience, except from the weight of the tumour, which continued to increase, until, at one time, the abdomen measured thirty-six, and at another forty-two, inches in circumference. He was out daily, until the middle of September, 1855, when he began to be confined to bed, and sank gradually until April 7th, 1856, when he died.

"Post-mortem Examination, fifty-four hours afterwards.—The whole of the abdomen, except the right inguinal region, was occupied by a large globular tumour, anteriorly firmly adherent to the parietes, and covered by peritoneum—posteriorly, lying in contact with the psoas muscle; the small intestines were thrust down to the right inguinal region; the spleen and liver were driven upwards into the thorax; the whole of the transverse

Fig. 60.



Appearance after death—from a daguerreotype.

colon was firmly adherent to the tumour; and a portion of the descending colon, which ran along the front, was for a short distance imbedded in it. The tumour, when removed from the body, was found to weigh thirty-one pounds. Traces of kidney-structure could be recognized, as if spread out over the entire substance; large masses of medullary cancer were visible on its surface. Upon section, the centre was found to be occupied by several pints of dark, thick fluid, floating in which were several fragments of the broken-down, cancerous mass; the more solid portions varied in consistence from that of firm medullary cancer to gelatinous matter in a semi-fluid state, large masses of it being found in every stage of degeneration; the kidney on the opposite side was much enlarged. No cancerous deposit was found in any of the other viscera." There had been rather more urine than usual, often passed, but never abnormal. This astonishing case only adds another to the many where life has long been maintained with only one kidney, and with comparative immunity from suffering.

U.

IRRITABLE BLADDER ACCOMPANYING TEDIOUS URETHRITIS. ITS TREATMENT, ETC.

Dr. John C. Egan, of London, mentions the irritable bladder supervening in the course of long and tedious urethral discharge, as being often very urgent. Calculous symptoms, even, are sometimes simulated by it. In stone, however, the pain and uneasiness are felt *after* passing all the urine, whilst in irritable bladder from gonorrhœa, it is only *during the presence* of the vesical contents that there is irritability, pain, etc. Hectic sometimes follows the chronic state of this affection. Dr. Egan advises opiates, both by the mouth and rectum, tepid hip-baths, castor-oil as a laxative, a short gum-elastic catheter, introduced only to the distal end of the urethra, left in for twenty-four hours, and then reintroduced after a short interval, is beneficial by giving rest to the organ. Copaiba and cubebs are believed to be of service by Dr. E.; and, when the acute stage has gone by, blisters both to the sacral and hypogastric regions. An alterative, mercurial course is advised. Infusion of buchu and decoction of pareira brava, singly or in conjunction, is suited to tranquillize the bladder; and the most favourable effects are sometimes produced by injecting the organ with tepid water.

V.

CANCEROUS DISEASE OF THE BLADDER.

It is generally thought that vesical cancer is extremely rare—doubtless it is so, compared with other affections of the bladder. It is somewhat remarkable that two cases should be reported at so short an interval as those recorded in the *Boston Medical and Surgical Journal* of January 22d and January 29th, 1857, under the head of "Reports from the Boston Society for Medical Improvement." The first is entitled "Cancer of the Bladder and Surrounding Tissues; of the Lumbar Glands and one of the Ribs." Of the bladder, the reporter, Dr. Ellis, states: "The bladder was empty; its cavity not more than three inches in diameter. Projecting from the lower half of the posterior wall was a fungous growth, rising half an inch above the surface, composed of lobules, some of which, apparently from pressure, had assumed a laminated form. Some of the same disease was also seen about the veru montanum." The prostate was also affected. The patient was sixty-six years old and unmarried.

The second case, reported by Dr. Jackson, was manifested in a woman of sixty-two years. *Post-mortem*.—A contracted bladder was found, and

the organ was affected with *encephaloid* disease; the growth "arose from its inner surface, posteriorly, in the form of soft, luxuriant, polypiform vegetations; the disease was between two and three inches in extent, pretty well defined, and rose above the surrounding surface about one-half or two-thirds of an inch. Otherwise the bladder was healthy, excepting a discolouration of the inner surface, and a slight deposit, apparently from the urine. The corresponding surface of the vagina was perfectly healthy; and, as in the case of cancer of the womb, there was no cancerous disease in any other part of the body. There was some acute inflammation of one of the kidneys; and the pelvis and ureter of each organ were dilated. In the head, nothing was found but a little serous effusion."

The urine was of low specific gravity—1.011—sufficient in quantity, but very pale, offensive, and purulent—discolouring a catheter instantly. Dr. Jackson believed that great fatigue, from a journey, by railway cars, of two hundred miles in nine hours, was an exciting cause of the malady. Hæmorrhage was the first symptom—the character of the symptoms, however, was "very mild," in view of the "usual irritability of the bladder." The patient died as she might if labouring under Bright's disease—in connection with which fact the reporter referred to "the low specific gravity of the urine."

We cannot but refer to another case, reported before the same Society by Dr. Storer, September 8th, 1856, published in the same journal, Nov. 13th, 1856, and entitled "Nephritis; Pyelitis; Villous Cancer of the Bladder." The whole account is highly interesting; the patient was a farmer of fifty-five years, and married. We transcribe the appearances presented by the bladder. "The bladder was four inches in diameter; its walls being half an inch in thickness, and the fibres of the muscular coat much hypertrophied. Upon many parts of the inner surface were small, dirty-white patches of lymph, some of them roughened by a deposit of salts from the urine. Rising from one-quarter to one-half an inch above the surface, just within and a little to the right of the meatus, was a soft, highly vascular villous growth, three inches long, and from one inch and a half to two inches wide. The vessels were parallel to the villi, which were very distinct, and, in water, presented very much the same appearance as the villousities of the chorion. The disease was confined to the surface, and resembled soft *encephaloid*."

"The microscopic characters were those of villous cancer, viz.: villi and large cells of various shapes and sizes, some of them containing large nuclei and nucleoli."

"Dr. Jackson remarked that this disease is here quite rare, and alluded to two cases, a specimen of one being now in the cabinet (No. 607). These were the fungous excrescences which had been compared by Wilson to the *placental vessels unravelled*."

Here are *three* cases of vesical cancer within quite a short period. Sometimes there seems a shower of specimens of similar description—a *quasi* epidemic.

W.

DR. BOZEMAN'S METHOD OF CLOSING VESICO-VAGINAL FISTULA, SUCCESSFULLY TRIED BY MR. I. BAKER BROWN, OF LONDON, IN ST. MARY'S HOSPITAL.

There was a fistulous opening of considerable size close to the os uteri.

The following short account of the case was lately published in the *Virginia Medical and Surgical Journal*: "The fistula having been with difficulty brought into view, the mucous membrane was carefully divided completely around the opening for three-eighths of an inch. Three silver wire sutures were then passed by a needle held in a *porte-aiguille*, and the two ends of each suture brought together. A silver button was now passed over the end of each double suture, and then a perforated shot passed over *each wire*, and pressed down firmly upon the button, by a pair of long forceps. The wires were then cut off close to the shot. A piece of lint, well-oiled, was placed in the vagina, and a catheter, with a bag attached, passed into the bladder. Nine days after the operation Mr. Brown removed the button and sutures, and found the union perfect. The patient was discharged, cured, in sixteen days.

[Dr. Bozeman says, in his account of the operations done in this country and elsewhere, that Dr. Mettauer operated in 1830, although Dr. Hayward published his first case in the year he operated (1839), and has the credit of being the first who operated in the United States. Dr. H. knew nothing of Dr. Mettauer's operation at the time of performing his own.]

X.

DIVISION OF THE FEMALE URETHRA FOR THE EXTRACTION OF CALCULUS.

Gustav C. Weber, M. D., of New York, in a late article published in the *New York Journal of Medicine*, proposes what he terms "a new method of removing calculi from the female." He had his patient placed crosswise on a bed, with her pelvis elevated; an assistant, separating the labia with the right hand, pressed "the posterior wall of the vagina downwards with a gorgeret." The operator then introduced a curved, sharp-pointed bistoury, protected by a conductor, into the urethra, withdrew the conductor, "and plunged the point of the knife through" the posterior wall of that canal, about one line from the sphincter, and then divided the passage in the median line by drawing the bistoury downwards and outwards. The point of a syringe was then introduced into the

sphincter, and the bladder injected with tepid water. Whilst this passed out, the finger, with polypus forceps upon it, was introduced; the stone broken into five pieces, and three of these discharged on forcible effort being made by the woman to empty the bladder. The other two were extracted by the forceps, the finger carefully guiding the fragments between the blades. The patient did well, and could perfectly retain her urine. "The two anterior thirds of the urethra did not unite, but still there exists no difficulty in passing the urine with a good stream." (*Loc. cit.*)

With a large calculus, this operation allows much facility of manipulation. Its novelty consists, mainly, in cutting from such a distance outwards, instead of splitting a portion near the meatus, and in leaving the *sphincter vesicæ* intact, which many other operators, when they have divided the urethra, to any extent at all, generally included. This is very frequently, but not universally, done. Another point upon which Dr. Weber very reasonably insists is, that other sections of the female urethra have either been "upwards, horizontally, or laterally," under the idea that a gutter must be left to allow the urine to flow off by. This procedure, however, was rather a cause of infiltration of urine and of further trouble. Dr. Weber, by his *downward* incision, ensured the flow of the urine away from the parts; and his case proved that, although the split portion was mostly unhealed, yet no inconvenience was caused.

A large stone should not, Dr. W. thinks, be brought immediately through the sphincter; it is, indeed, better to break it, as was done in his case.

This operation is certainly preferable to very extreme dilatation, liable, as it always is, to induce incontinence of urine, etc.

Weber's operation is that of Le Cat, with the above-noted modification—certainly a very important one.

Y.

INSTRUMENT FOR EXTRACTING A HAIR-PIN FROM THE FEMALE BLADDER.¹

A double hair-pin was drawn from the bladder by Prof. Galli, of Lucca, by means of a very simple instrument. To one of the extremities of a metallic stem, a little hook is soldered, which forms nearly three-fourths of a circle around the stem. When the pin presents its curved portion forwards, the action of the instrument is readily understood; when its curve is turned backwards, the hook, being pushed over one of the pin-points, and slid along the shaft, moves the whole pin towards the fundus of the

¹ Exhibited to the French Academy of Medicine, February 12th, 1855. *Gaz. Méd. de Paris.*

bladder; the pressure being continued, in the same direction, the pia executes a rotatory movement upon itself [*vulgo*, "turns a somerset"], which brings its curve in front [or position No. 1, *ut supra*], when its extraction is evidently quite easily effected—the movement being a simple retraction of the instrument.

Z.

SPASMODIC, MISTAKEN FOR ORGANIC, PERMANENT STRICTURE.

The importance of accurately distinguishing these conditions, and the positive existence of the former—denied, as it has been, by many—are well illustrated by a report of a case by M. Dassier, in the *Journal de Médecine* of Toulouse. Several practitioners had pronounced that there was organic permanent stricture in a young man in whom catheterism was impracticable with metallic sounds. Scarcely were they introduced into the urethra, than they were arrested. "The patient was on the point of having forced dilatation performed," according to Perreyve's method, when he decided to try the dilatation by Béniqué's procedure, *i. e.* with flexible bougies, gradually increasing their size.

"At one session, by this process, those from the smallest size to those of ten millimètres in diameter were reached. A few such trials cured him, and the asserted *organic* stricture was wholly destroyed.

AA.

THE BUTTON-HOLE INCISION FOR IMPASSABLE STRICTURE; LA BOUTONNIÈRE OF THE FRENCH.

There has been very great diversity of opinion in reference to this operation. Within a few years, it has been revived in this country with considerable success. Dr. Gross had performed the operation eight times at the date of publishing his volume¹ (1855), "and, in every instance save one, with the most satisfactory results." The exception appeared to be owing to the patient's negligence.

Dr. Gross uses quite strong language, however, relative to the procedure. He says: "It is by no means free from danger, and requires the most consummate skill for its successful execution. None but a madman or a fool would attempt it, unless he had a profound knowledge of the anatomy of the parts, and a thorough acquaintance with the use of instruments. Of all the operations of surgery, this is the least to be coveted."

It certainly never should be done if any other method will succeed.

¹ Diseases of the Urinary Organs.

Malgaigne disparages it, decidedly: "Opération généralement mauvaise." (*Méd. Opératoire*, p. 652.) In certain desperate cases, it may be demanded. The position of the patient is that for lithotomy—hands and feet bound together. A grooved staff or director, and a narrow-bladed scalpel are needed. The incision is made into the perinæal *raphé*; its length about one inch and a quarter. Reaching the staff, the knife cuts the constricted portion from before backwards; a catheter being introduced, treat the case as for lithotomy. When it is not possible to introduce a director properly after the first incisions, some have advised cutting without a guide—a proceeding totally and justly condemned by Malgaigne (*loc. cit.*) and others.¹

BB.

Mr. Henry Thompson reported² the following facts to the Pathological Society of London, relative to *sacculation of the bladder*, complicated with neglected urethral stricture.

Only a few weeks before his death, the patient came to Marylebone Hospital (Infirmiry) under Mr. Thompson's care.

Autopsy.—The bladder was contracted and hypertrophied, and had a sacculus on its left side, almost as large as itself.

[*Nota bene*.—The urethral condition and the danger of neglecting it.]

CC.

ADVANTAGEOUS POSITION FOR PATIENTS OBLIGED TO PASS THE CATHETER
ON THEMSELVES.

Dr. Lemazurier, in the *Gazette Médicale de Paris*, recommends that the instrument be passed whilst the patient is sitting in a hip-bath; the posture facilitates the procedure—the pelvis is depressed, the thighs are strongly flexed upon the trunk, and the latter somewhat bent forwards.

The following translation of a portion of his communication is from the *Boston Medical and Surgical Journal* for January 1st, 1857.

"In this position, one of my patients, subject to spasms of the urethra, and obliged to resort to the skilful hand of another person, endeavoured to pass his water by introducing into the canal a curved gum-elastic catheter, without the wire. Having been frequently discouraged, under similar circumstances, by his repeated and fruitless efforts, he was not a little astonished at the promptitude and facility with which he introduced the instrument into the bladder, and at the complete absence of any un-

¹ See remarks by Mr. Thompson. (*Op. cit.*, p. 239.)

² December 10th, 1855.

favourable result. Since that time, he has several times repeated the operation, and always with the same success, by placing himself in the same position."

DD.

GUTTA-PERCHA BOUGIES BROKEN IN THE URETHRA.

The occasional occurrence of this accident should lead to great caution in choosing *fresh* bougies of this substance, as, when old and exposed to the air for some time, they become very brittle. Dr. J. Mason Warren reported a case illustrative of this to the Boston Society for Medical Improvement. All efforts to dislodge the broken bougie, by forceps and other instruments, by external manipulation of the urethra, and by passing a finger into the rectum, etc., proving futile, the bladder was freed by a catheter passed by the side of the bougie, which latter came out spontaneously, and piecemeal, from the third to the sixth day. No force whatever was used in attempting to withdraw the bougie when the fracture took place, so that its breaking must have been owing to a change in the gutta-percha. When this substance is used for taking impressions of stricture, great care should be exercised that it be fresh. The substance has fallen into disrepute on account of its unreliability on the above grounds.

Dr. Gould, of Boston, related a case somewhat similar to the one just stated. A patient came ninety miles, with about an inch and a half of bougie (not stated whether gutta-percha, but presumed to be) broken off in the urethra. Dr. G., feeling the fragment, "partly in the membranous portion of the urethra, by pressure behind it, succeeded in dislodging it, and by pushing it before the finger, brought it out of the urethra."

When a piece of gutta-percha bougie falls into the *bladder*, its immediate extraction should, of course, be undertaken. If delayed, incrustation of calculous matter upon the fragment will render the accident yet more formidable. In the *Lancet* of January 2d, 1858, is an account of an operation performed at Guy's Hospital, by Mr. Birkett, for the removal of a piece of bougie made of gutta-percha, which had remained in the bladder for a month, and had become so encrusted that it could not be withdrawn from the urethra. The lithotrite was therefore put in requisition. The whole account may be perused with benefit. The caption of the report reads thus: "About two inches of gutta-percha catheter broken off, and remaining in the bladder, where it became encrusted with uric acid and phosphatic deposit; cutting it into fragments with the lithotrite; expulsion of the fragments, and subsequently of a calculus and a large quantity of pus, by the urethra; cure."

The man had introduced the catheter himself, which accounts well as neglect to remove it; for had any surgeon met with the accident, it would be presumed that it would have been at once extracted. As the report of the above case remarks, "had the bougie not been gutta-percha, it could not have been cut into pieces, as was done here. Any soft substance accidentally getting into the bladder, such as sealing-wax, for instance, similar to a case of Mr. M'Whinnie's, at St. Bartholomew's Hospital, about eighteen months ago, ought invariably to be got rid of by the lithotrite."

EE.

IMPERFORATION OF THE GLANS PENIS IN CHILDREN.

This fault of conformation is occasionally observed, and demands immediate remedial measures. There may be complete or incomplete imperforation. When incomplete, the insufficient opening at the extremity of the *glans* may be readily enlarged by incision and a small pledget of lint, acting like a tent, introduced. Usually, freedom of the passage is soon established.

In complete imperforation, there may be a groove, at the termination of the closed urethra, indicative of the situation of the canal, and the knife, or some convenient cutting instrument, should be passed through the adherent portion. A tent completes the operation.

Bouchut mentions two cases in newly-born children, treated by incision. He refers to several abnormalities and accidental lesions occurring to the genito-urinary apparatus of both sexes; amongst others, congenital occlusion of the urethra, with or without occlusion of the vulva. Incision, and the wearing a catheter for some days, are curative. When there is a narrowing or complete obliteration of the urethra, so that, as Littre and Cabrol have observed, "the urine ascends by the urachus and escapes by the umbilicus through a small, soft, red, and spongy excrescence," Bouchut advises opening an artificial passage for the urine "by creating a canal at the situation, and in place of, that which should exist. In a similar case of occlusion, I should not hesitate to make it by practising puncture of the bladder in the direction of the urethra, and by means of the continued introduction of the catheter to preserve the formation of the artificial canal." (*Diseases of Children*, Bird's translation, 1855, p. 552.)

It is also remarked that such a condition may continue for ten or twelve years, or even for life. "Usually the child dies from retention of the urine, urinary infection, peritonitis, or rupture of the bladder."

The following report of a case of imperforate urethra, published in the *Gazette Médicale de Paris*, from the *Journal für Kinderkrankheiten*, 1856, is sufficiently remarkable to warrant its presentation here.

"On the 21st of September, a child was born whose urethra was discovered by the midwife to be imperforate. The penis was longer than usual, and as large as the [adult] little finger. A shallow depression was observed at the usual situation of the urethral orifice, and the appearance was such as to induce the belief that the canal was immediately beneath the depression spoken of. Notwithstanding, an incision, made over this furrow, caused much hæmorrhage, but did not open the canal. The operator then ran the risk of plunging a straight bistoury for about one inch in the direction the canal ought to take; but resistance was still felt. The parents refused to allow any further efforts to be made, although the surgeon told them that the child must die, unless the urine could be made to flow naturally. Next day, the surgeon returned with a colleague; but their solicitations to continue operative measures were in vain. The infant, nevertheless, seemed not to suffer; it took the breast and slept well, and no fluctuation could be felt above the pubic symphysis. The reporter of the case was long in expectation of the announcement of the child's death, and was very much astonished to learn that, on the morning of the 26th of September, the child's napkin had been found wet. Nature had completed the operation. The urine now flows freely."

The editor of the *Gazette* rightly observes that the long continuance of the retention of urine in this case, without untoward results, is very remarkable.

It seems nearly certain that a fatal conclusion would have happened had not art at first done so much. A practical illustration of "Nature and Art in the Cure of Disease," Art being here unquestionably the superior; for, while unaided Art would probably have wholly succeeded had a second trial been permitted, it can hardly be doubted that Nature *alone* would have failed.

FF.

REMARKABLE CASE OF SUCCESSFUL URETHROPLASTY.

The case is detailed in several numbers of the *Gazette des Hôpitaux* (June 20th, 1857, *et seq.*). The urethra, and indeed almost the entire penis, was severed by a sharp, cutting instrument. The wound was given under peculiar advantages for being effectual, viz., by a jealous woman, at the moment when intromission of the virile organ was taking place—she having allowed the meeting for the purpose of thus revenging herself upon a somewhat neglectful lover.

The account of the case, and of the method of reparation, with the result, are highly interesting, but too lengthy to be quoted here, or even to be presented in the form of a digest. The facts are especially important as showing how serious a lesion of the parts may be completely

recovered from. This patient was restored, so that copulation, as well as urination, was possible. The power of plastic surgery is also manifested.

M. Arlaud, of Rochefort, was the operator, and M. Verneuil the reporter. The latter states that he has collected more than forty cases of urethro-plastic operations, and says that if the unsuccessful ones were related, which they rarely or never are, the number would be quadrupled.

The above patient's life was endangered at first by the violent hæmorrhage, and subsequently by retention of urine.

GG.

SUPRA-RENAL CAPSULES.

Sugar in the Treatment of Bronzed Skin referred to Disease of the Supra-renal Capsules.—The *Medical Times and Gazette*, in a late number, states that Dr. Todd has been administering *sugar*, freely, to a woman in King's College Hospital, suffering under the above mentioned affection. The patient, it is thought, has derived considerable benefit from the dietetic use of the sugar. She has less of the *malaise* and debility characteristic of the disorder.

The theory of the treatment, it is said, is "based on the belief (founded on analysis of the blood) that the sugar-making function of the liver is interfered with by the disease." The measure is plausible, and should have a fair trial.

Sugar and saccharine food are now being tried in *diabetes*, with much promise of success, instead of restricting patients to a purely nitrogenous diet. (Vide *Braithwaite's Retrospect*, July, 1858, pp. 98, 99, *et seq.*)

HH.

BLADDER.

Supra-pubic Puncture of the Bladder—An interesting discussion lately took place at the Paris Surgical Society, relative to this operation. We have already referred to the main points to be kept in view in deciding upon its performance and in the subsequent management of the patient. A few of the remarks and opinions of the French surgeons now most actively engaged in practice may fitly be quoted here. We extract them from a digest to be found in the *British and Foreign Medico-Chirurgical Review* for July, 1858, and which was prepared for that journal from the *Gazette des Hôpitaux*, 1858, No. 59. The discussion arose "on the occasion of the presentation of a memoir by M. Fleury, in which he stated he had often performed the operation with success, and considered it a very easy one. M. Boinet regretted that the author had not stated

whether his patients suffered consecutively from the adhesion of the bladder to the abdominal wall at the seat of puncture, and the consequent impediment to the functions of the organ." M. Chassaignac was not disposed to admit the ill consequences ascribed to these adhesions—there are none, he said, following the high operation for lithotomy, notwithstanding there are more adhesions. He thought, however, that supra-pubic puncture of the bladder was a more serious operation than M. Fleury considers it. The necessity for using a very long trocar to reach the bladder when the patient is very fat, and the deep plunge of the instrument which is required, expose the surgeon to the liability of wounding the opposite side of the bladder. Chassaignac had himself met with this accident when puncturing the bladder under such circumstances. M. Robert said he preferred puncture of the bladder to forced catheterism; he had performed the operation seven or eight times. He retains a metallic canula in the wound for a fortnight, and then substitutes a caoutchouc tube; he has no fear of the accidents attributed to keeping the metallic instrument in the bladder. "He observed, also, that the urine should not be allowed to run continuously from the canula. This should be plugged, and only opened every three or four hours, otherwise the bladder, contracting too readily upon itself, may abandon the canula." M. Deguise places a catheter in the bladder, by the wound, on the first day, and changes it the third or fourth; he finds no difficulty in doing this, nor does he see why there should be any "in introducing a catheter by the track of a canula that had remained *in situ* for eight days." He advises a preliminary incision down to the linea alba; the operation is then "a very easy one." His preference is for a straight, instead of a curved canula; the latter he considers "liable to injure the *bas-fond* of the bladder or the prostate." He introduces the trocar horizontally, and immediately on withdrawing it, passes a gum-elastic catheter into the bladder through the canula, the latter being then slid over it and removed. The catheter is then to be fixed *in situ*. M. Huguier thought the operation was often a very difficult one, and instanced the ascension of the prostate and *bas-fond* of the bladder as conditions rendering it such. In cases of extreme distension, the bladder rises, like the gravid uterus, above the superior aperture of the pelvis. This state of things prevents the fluctuation felt through the rectum, and which is so much insisted on by authors, from being perceived—the organ is out of reach of the finger. When this is so, the prostate may be wounded, even when not at all enlarged. Richerand, said M. Huguier, met with the latter accident. He was very partial to the operation, and performed it skilfully. The straight canula, and its introduction horizontally, were advocated by M. Huguier, as by M. Deguise. The former rarely removes the canula before the seventh day; a straight instrument, in his experience, has never

excited any irritation of the posterior wall of the bladder. "He, however, takes the precaution of introducing a gum-elastic catheter into the canula and fixing it there, so that its smooth, rounded extremity, furnished with its lateral eyes, may project at least a centimètre beyond the vesical extremity of the canula." M. Giraldés disputed the proposition of M. Huguier relative to the ascension of the *bas-fond*; he thought the ease with which the bladder is punctured from the rectum proved that the relation of the parts is not changed. He also referred to Mr. Cock's success in the rectal operation, at Guy's Hospital. Mr. C. has declared the latter by far the easiest to execute. M. Lenoir, although attached to the hospitals for twenty years, has only twice had recourse to supra-pubic puncture. He thinks it should be reserved for extreme cases, and he had been "struck with the facility with which some surgeons decide upon the performance of this operation." He denied the truth of M. Huguier's opinion, that the prostate gland ascends. If the latter ever rises above its ordinary level, it is owing to its becoming hypertrophied. It then might possibly be punctured with a curved trocar. In prostatic retentions, however, M. Lenoir never punctures the bladder. There being no opportunity to restore the natural passage, the patient would be exposed to permanent hypogastric fistula. He therefore prefers, in such a case, forced catheterism by means of a conical instrument, thus forming an "intra-urethral puncture through the prostate." This "intra-prostatic fistula," he adds, "will fulfil the functions of the prostatic part of the urethra." He always substitutes a gum-elastic, for the conical metallic catheter. "M. Huguier added, that although the anterior portion of the prostate is fixed by ligaments and aponeuroses which do not allow of its rising, its posterior part is in fact drawn up during distension of the bladder. The finger cannot then feel the globular or cylindrical fluctuation which has been described as one of the principal signs of retention; but this does not prevent a long and concave trocar, directed backwards and upwards, from reaching the bladder. M. Chassaignac also admits this elevation of the posterior part of the prostate. He thinks the preliminary incision of the integuments, as recommended by M. Deguise, might give rise to infiltration; and he rejects puncture by the rectum as dangerous, because of the risk of penetrating into the recto-vesical cul-de-sac of the peritoneum."

II.

ADHESION OF CALCULI TO THE BLADDER.

The *Medical Times and Gazette* for June 5th, 1858, contains some remarks relative to this subject, from which we make a few extracts. We

have already mentioned the possibility of the adherence of a calculous body to the bladder (p. 429). Surgeons have doubted the fact, but, although it must be an infrequent occurrence, it is now not disputed that it occasionally takes place. The journal above cited furnishes us with the following facts: In addition to the statement that several instances of adherent calculi have been observed *post-mortem*, ratifying the above conclusion, it gives some particulars of a case under the charge of Mr. Henry, at the Middlesex Hospital. "The patient was a boy, aged eleven, in whom symptoms of stone had long existed, but of late with considerable mitigation. A large calculus was easily detected. In the operation, Mr. Henry stated that he found it connected with the anterior part of the bladder, and difficult to reach. Repeatedly it eluded the forceps, and was eventually only seized by the aid of firm pressure made over the lower part of the abdomen. When extracted, its exterior presented some shreds of organized membrane firmly attached. These shreds were submitted to microscopic examination, and were then found to present all the characters of granulation-structure undergoing organization. The lad recovered, and happily no opportunity was afforded for inspecting the interior of the bladder." (*Loc. cit.* and the *Medical News and Library*, Blanchard & Lea, August, 1858, pp. 115, 116.)

The *Lancet* of July 17th, 1858, reports a calculous case in a boy of "fourteen" years, which we conclude is identical with the above, Mr. Henry having exhibited the calculus. The latter "was found to be adherent to the upper part of the bladder by means of a distinct pedicle or stalk." The weight of the stone is stated to have been three ounces and three-quarters; its nucleus consisted of pure lithic acid. The boy had been suffering with calculous symptoms for two years, but had been much better latterly. "The surface of the stone was coated with an organized substance which caused the adhesion. The comparative mildness of the symptoms, latterly, was explained by the position of the stone. * * * No doubt ulceration had taken place on the mucous membrane: and, lymph being poured out, adhesion to the stone resulted." (*Loc. cit.*, pp. 71, 72, English edition.)

JJ.

URETER; TREATMENT OF PASSING CALCULUS.

Inversion of the Body for the Relief of the Symptoms produced by the Passage of a Renal Calculus along the Ureter.—This procedure has lately been successfully tried by Professor Simpson, of Edinburgh, in the case of a female patient who had frequently passed renal calculi, and always with extreme suffering. "This patient," as it was stated by Prof. S., in

reporting the case, and exhibiting them to the rectum, and passes them up Chirurgical Society of Edinburgh, "had dug them forwards, the stone is agonizing symptoms accompanying the passage grasped between these two sion of the body." She was thus treated, because resistibly to suggest to the passing calculus, falling down into, and becoming means of the two ureter, acted at its point of arrestment as a pea-valve, and danger of the lating the urine above, or in the pelvis of the kidney and sure." of the ureter, led to the accompanying distress by the morbid ly of these portions of the urinary ducts. When the body was inverted, the affected side manipulated, the calculus probably fell backwards, . . . consequently upwards, by its own gravity. At all events, whatever be the explanation, the practice, in this and one other case, had immediately relieved the patient. He had seen partial relief from changed position in one case of gallstones." (*Edinburgh Medical Journal*, July, 1858, pp. 76, 77.)

KK.

URETHRA.

Mr. Syme's "New Operation for Impermeable Urethra."—Mr. Syme has a paper upon this subject in the *Medico-Chirurgical Transactions*, vol. xl., 1857, which is referred to in a critical notice of that work in the *British and Foreign Medico-Chirurgical Review*, for July, 1858. We have already alluded to this operation (*vide* pages 496, 497, foot-note), but take this opportunity to quote certain of Mr. Syme's observations as presented by the *Review*.

"Mr. Syme commences by pointing out the error of those who have attributed to him the opinion that in no case is the urethra impermeable to instruments. All that he has asserted is, that the nature of a *stricture* is inconsistent with impermeability; and he has never denied, that in consequence of wounds or sloughing, the urethra may become completely *obstructed* beyond the fistulous opening, so as to be impermeable both by urine and instruments. Every practical surgeon knows full well the distressing nature of these cases, and how embarrassing and uncertain in its results is the ordinary operation of cutting upon the point of a catheter passed down to the seat of obstruction." (*Loc. cit.*, p. 109.)

The only points not mentioned in our reference to the operation at the page of this volume above cited—and which, doubtless, would be understood as implied—are the confiding of the staff to an assistant, whilst the surgeon supports it on the perinæum, or by a finger in the rectum, and "pushes the director onwards in the direction it ought to take if the canal were free, so as to pass the obstructing texture, enter the groove, and proceed into the bladder."

It is also mentioned that the fistulous opening in the urethra might be dilated, if necessary, prior to passing in the staff. Such cases are to be subsequently treated "as in the ordinary operation for stricture by external incision."

LL.

URINE, INCONTINENCE OF.

Galvanism in Incontinence of Urine.—The *Medical Times and Gazette* of Nov. 14th, 1857, refers to experiments by Mr. Simon in treating enuresis by means of the galvanic current, conveyed to the bladder through a catheter. Two or three decided cases, thus managed, showed satisfactory improvement. As the *Gazette* remarks, the cases selected for treatment by this method, "must, of course, be those of true incontinence from atony, and not of irritable bladder from urinary causes." (*Loc. cit.*, and *Braithwaite*, Part 37, p. 165.)

MM.

VESICAL CALCULUS.

New Methods for removing Calculi from the Bladder.—Dr. Andrew Buchanan, of Glasgow, Scotland, one of the surgeons to the Glasgow Infirmary, calls attention to certain methods lately devised by him for the extrusion of calculi from the urinary bladder. We have already described the variety of the mesial operation for lithotomy, which Dr. Buchanan some time since proposed (see pp. 438, 439), and which is performed with a rectangular staff. In his present communication, published in the *Glasgow Medical Journal* for July, 1858, Dr. B. again refers to the greater facility in extracting the stone, attainable by the mesial or "rectangular" operation; and refers this to the "diminishing, as far as can be done, the distance between the opening made in the bladder and the external aperture of the operation wound." Wishing further to facilitate the extraction of the stone, Dr. B. has had recourse to two methods, which we will briefly indicate. The first is by extrusion of the calculus with the fingers alone: "The forefinger of the right hand, introduced into the bladder through the operation wound, readily reaches the stone, and has it so much at command, that it can easily be brought down into the triangular space at the neck of the bladder, and placed there so that its longest diameter—if it be not spherical—may be parallel to a line at right angles to the middle of the incision of the bladder." This position Dr. B. considers to be that which is the most favourable for the extraction of the stone. Retaining the latter thus, by the pressure of the forefinger, he introduces the fore

and middle fingers of the left hand into the rectum, and passes them up beyond the prostate, "when, upon pressing them forwards, the stone is distinctly felt by them; and it is so firmly grasped between these two fingers and the forefinger of the right hand, as irresistibly to suggest to the mind the attempt to extrude it from the bladder, by means of the two fingers of the left hand pressing it from behind, while the forefinger of the right hand guides it outward, and regulates the direction of the pressure." The operator adds, that only spherical and smooth stones can be readily thus removed, unless a larger incision than usual is made. The process, however, "is often an important preliminary" to other methods of extraction—as to the ordinary mode, with forceps, and to that next suggested by Dr. B., by using the "*landing-net*," so termed from its resemblance to a contrivance of the same name familiar to anglers. The form of the instrument, as at present used by Dr. B., resembles the common forceps furnished with a net—the blades not being intended "to grasp the stone, but merely to open and shut the mouth of the sac which is attached to them." They are curved, rounded and attenuated, resembling "stout stocking-wires;" and form, when closed, an oval orifice to the sac. Two rounded knobs, like peas, compose their extremities, so that no harm can be done by their introduction into, or their use within the bladder. Dr. Buchanan recommends the following as the preferable way of using his instrument:—

"Place the stone and the fingers in the positions recommended for the process first described; that is, the stone lying immediately behind the opening in the bladder, with its long diameter at right angles to the direction of the opening; the index finger of the right hand introduced through the wound, and resting on the stone, and the fore and middle fingers of the left hand in the rectum, ready to press upon the stone from behind. Let the finger of the right hand be now withdrawn, and the instrument introduced in its place. The stone is now pressed by the fingers of the left hand against the two wires forming the mouth of the sac, and these separating, the stone is forced into the sac itself, and secured by the shutting of its mouth. The two slender wires of the sac add little to the bulk of the stone, so that any difficulty experienced extracting it can depend only on a disproportion between the size of wound and the stone which is to pass through it; and if that can be overcome by address and moderate traction, it must be met by the treatment of the wound."

[NOTE.—Dr. Wheeler, to whom the proof of the account of his case of calculus formed upon a hair-pin (see page 94) was sub-

reminds us that it was omitted to be stated that the pin, as it appears in the engraving, was bent during the process of extraction—it having been found impossible to withdraw it without flexing it upon the calculus. It was entirely straight when introduced—as, indeed, it will be evident it must have been, easily to slip into the bladder.]

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